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Strait of Georgia Creel Survey Sport Fishery Statistics, 1983

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SPORT FISHERY STATISTICS, 1983

by

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ABSTRACT

Shardlow, T. F., K. K. English, T. Hoyt, G. E. Gillespie and T. A. Calvin. 1989. Strait of Georgia Creel Survey sport fishery statistics, 1983. Can. MS Rep. Fish. Aquat. Sci. 1872: 53 p.

Catch and effort statistics for the Strait of Georgia tidal sport fishery are presented for each month in 1983. The statistics were derived by combining the data from over 26,000 interviews and 50 aerial surveys. Estimates were provided for the number of sport fishing boat trips and the catches of chinook, coho, and pink salmon along with rockfish, lingcod, dogfish and other finfish. Also given are numbers of marked (adipose fin-clipped) and unmarked chinook and coho examined during the creel survey, and the age composition of chinook catches. The appendix includes all catch and effort statistics for each month and Statistical Area combination.

Keywords: salmon, creel survey, sport fishing, catch, effort, age composition.

RÉSUMÉ

Shardlow, T. F., K. K. English, T. Hoyt, G. E. Gillespie and T. A. Calvin. 1989. Strait of Georgia Creel Survey sport fishery statistics, 1983. Can. MS Rep. Fish. Aquat. Sci. 1872: 53 p.

Les statistiques relatives aux prises et a l'effort de pêche de la pêche sportive de la zone tidale du détroit de Géorgie sont présentées pour chaque mois de 1983. Ces valeurs ont été obtenues en réunissant les données de plus de 26000 entrevues et 50 relevés aériens. On y trouve les estimations du nombre de sorties des bateaux de pêche sportive et des prises de saumons quinnat, coho et rose en plus de celles de scorpènes, d'ophiodon, d'aiguillat et d'autres poissons. Le nombre de saumons quinnat et coho marqués (coupe de la nageoire adipeuse) et non marqués examinés au cours des relevés des prises et la composition par âge des prises de saumon quinnat sont aussi présentés. On trouve aussi en appendice toutes les statistiques relatives aux prises et à l'effort de pêche pour chaque mois et combination de zones statistiques.

Mots clés: saumon, releve des prises, pêche sportive, prises, effort de pêche, composition par âges.

1. INTRODUCTION

This report documents the 1983 catch and effort statistics for the Strait of Georgia sport fishery and discusses methodology for collecting these data. During the 1970s, the sport fishery grew to be the largest harvester of chinook and coho salmon in the Strait of Georgia. Table 1 shows historical catch statistics for the Strait of Georgia sport fishery for the period 1960-1983. During this period, fisheries managers recognized the deficiencies in traditional methods of estimating sport catch and the need for accurate catch statistics. In 1980, the Georgia Strait Creel Survey Program was initiated to meet the need for accurate and timely sport catch statistics for chinook and coho. Since 1980, the objectives of the Creel Survey Program have been expanded to provide accurate estimates of sport catches of all finfish, and age and length composition of chinook catches. This report is one of a series of Georgia Strait Creel Survey Reports which document annual creel survey activities and estimation procedures, and provide official published Strait of Georgia tidal sport fishing catch statistics.

The 1983 creel survey gathered the most comprehensive set of annual sport fishing data for Strait of Georgia to date. The only project interruption occurred during April when no interviewing was done due to year-end staffing difficulties. However, aerial survey data were collected so that indirect estimates could be made for April.

2.0 METHODS

The Strait of Georgia Creel Survey is comprised of two independent surveys: angler interviews and aerial overflights. Angler interviews provide data on sport fishing catch per unit effort (CUPE) and daily activity patterns. Aerial overflights provide estimates of the total sport fishing effort in the study area at the time of the aerial survey. These data are combined to provide monthly estimates of total sport fishing effort and total catch of salmon and groundfish in the sport fishery. In its simplest form, estimated total catch is calculated by multiplying estimated total effort by catch per unit effort.

The design of the Strait of Georgia Creel Survey conducted in 1983 was similar to that used by DPA Consulting Ltd. (1982) with some modifications to the data analyzed, sampling intensity, flight routes and data processing. Sampling was conducted during each month of the year and estimates were produced for 10 time periods. January and February data were grouped together, as were November and December data because of reduced fishing activity and sampling in these winter months. Mid-week days and weekend days were considered independently because sport fishing activity is known to be quite different between the two types of days. The Strait of Georgia study area was also stratified by geographic region. Catch and effort statistics were produced for each of the 10 Statistical Areas within Georgia Strait (Areas 13 - 19 A, 19 B*, 28 and 29, Fig. 1); Statistical Area 19 B* includes portion of Area 20 to Sheringham Point (See Appendix B for a complete description of the study area).

Table 1. Tidal sport catch of coho and chinook salmon and effort statistics for the Strait of Georgia, 1960 - 1983.[a]

Year	Effort (boat trips)	Catch	
		Coho	Chinook
1960	189150	238000	83000
1961	199935	152000	63000
1962	205547	167000	86000
1963	247590	199000	65000
1964	198120	182000	51000
1965	250020	175000	53000
1966	259100	249000	80000
1967	254500	200000	115000
1968	265030	250000	150000
1969	281475	200000	185000
1970	306255	500000	220000
1971	341123	800000	255000
1972	300349	335000	287000
1973	293141	373000	272000
1974	443441	772000	269000
1975	334490	454000	398000
1976	340729	415000	490000
1977	363350	682000	372000
1978	369035	1103000	500000
1979	404710	708735	350000
1980	769000	655000	371000
1981	637000	391200	253300
1982	642200	436090	163793
1983	574257	404031	198433

[a] Source: Coho catch statistics: 1960-1978 from Argue et al. (1983), 1979 from R. Kadowaki (pers. comm.), 1980-1982 from Shardlow et al. (MS 1989).
Chinook catch statistics: 1960-1977 from Argue et al. (1983), 1978 and 1979 from B. Riddell (pers. comm.) following the methods of Argue et al. (1983), 1980-1982 from Shardlow et al. (MS 1989). Effort statistics: 1960-1979 from annual published and unpublished Fisheries Officer statistics, 1980-1982 from Shardlow et al. (MS 1989).

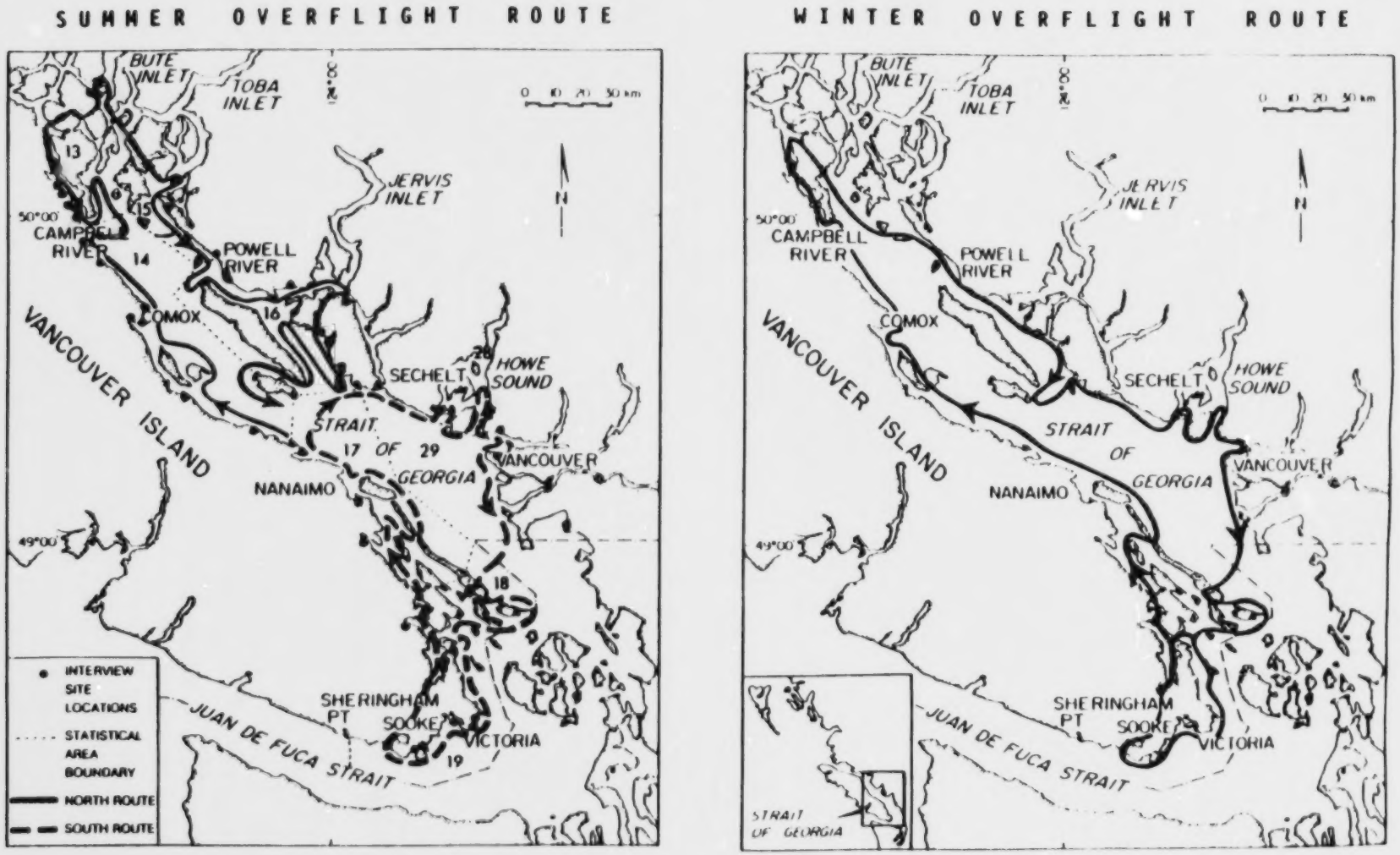

Figure 1. Interview site locations, and summer and winter overflight routes, Strait of Georgia, 1983.

2.1 FIELD SURVEYS

2.11 Angler Interviews

Sport fishermen were interviewed at the end of their fishing trip to determine time spent fishing, locations fished and catch of each species on the trip. Demographic information was also collected during the interview. Figure 2 shows the interview form used in 1983.

Interviewers trained in fish identification inspected each boating party's catch. Unlike other methods of collecting sport fishery information, such as mail-in or telephone surveys, there was little memory-related recall bias, non-response bias, and fish identification concern with this approach to calculating sport fishery catch. Landed chinook and coho were checked for a missing adipose fin whichindicates the presence of a coded wire tag embedded in the fish nose cartilage. In addition, scale samples for age determination and measurements for none-fork length were taken during every sampling shift in the winter and every other shift in the summer. Five scales were removed from the INPFC (International North Pacific Fisheries Commission) preferred area of each biosampled chinook (Mosher 1968).

The interviews were conducted at 31 landing sites (boat ramps, marinas, or resorts, Fig. 1) representative of sport fishing activity in each Statistical Area. The number of sites selected in each area was dictated by targets of desired precision and number of surveyors available. For each area - day type - work block stratum, sampling shifts at a site were chosen on a near random basis from the total number of shifts available. For definition of the above terms (day type, work block, shift) see Section 2.2.

2.12 Aerial Overflights

Aerial surveys were conducted from float planes travelling along pre-defined routes which allowed observers to count vessels actively sport fishing throughout Strait of Georgia. Planes flew at an altitude of 500-700 feet to facilitate a broad range of vision and still allow easy identification of vessel characteristics. Each plane carried three observers, two on the right side and one on the left, and each observer counted sport fishing boats to his/her side of the flight path. Figure 1 shows the flight path used in 1983. The winter (October-April) flight path was slightly reduced to correspond with lower witner effort.

The flight path and time of departure were designed to cover major concentrations of sport fishing activity at peak periods. Whenever possible, the route was flown to keep most of the sport fishing boats to the right side to allow averaging of the two right side counts. To maximize precision, flying times during which fishing effort was rapidly changing, were avoided. The number of overflights each month was governed by targets of desired precision and the expected number of interviews from the given number of sampling shifts. The days for overflights during a month were randomly selected for each day type.

STRAIT OF GEORGIA SPORT FISHING CREEL SURVEY N° 4318

Landing Site _____ Statistical Area _____

Interviewer _____ Date ____/____/____ (YR/MO/DAY) TIME ____:____ AM PM

Present Boat Trip Completed

1. Total Number of Individuals in Party: [ ]

2. Time of Landing ____ : ____ AM PM Time Block [ ]

3. Was your party sport fishing on this trip? Yes No

4. Guided: Yes No

5. Residences of Party: B.C. [ ] Rest of Canada [ ] Other [ ]

6. Length of Boat Trip [ ] Hrs.

7. What was the main species at which fishing effort was directed?

(1) Salmon (2) Groundfish (3) Shellfish (4) Other (5) Non-specific

8. Times Lines were IN the water (EXCLUDE time not fishing)

AM		PM	
(1) before 7:00	(5) 10:00-10:59	(9) 2:00-2:59	(13) 6:00-6:59
(2) 7:00-7:59	(6) 11:00-11:59	(10) 3:00-3:59	(14) 7:00-7:59
(3) 8:00-8:59	(7) 12:00-12:59	(11) 4:00-4:59	(15) 8:00-8:59
(4) 9:00-9:59	(8) 1:00- 1:59	(12) 5:00-5:59	(16) 9:00-plus

9. Average number of lines in water for TOTAL boat party [ ]

10. Catch Summary

Total Catch for Trip		1st Area	2nd Area	3rd Area
[ ]	Kept	[ ]	[ ]	[ ]
	Released	[ ]	[ ]	[ ]
Total Time Fishing	Time	[ ] hrs.	[ ] hrs.	[ ] hrs.
[ ] hrs.				

GO TO MAP

Marked [ ] Unmarked [ ]

Figure 2. Sample of 1983 interview form.

2.2. DATA ANALYSIS

The description of terms, variables and subscripts used in this report is given in Table 2.

2.21 Calculation of Catch and Effort Statistics

To estimate the monthly catch and effort, three components had to be calculated from that month's data:

(1) the weighted mean daily fishing pattern from interview data,
(2) the weighted mean catch per unit effort from interview data and
(3) the mean sport count from overflight data.

The equations used to estimate the means and variances for all catch and effort statistics are shown below. For April which had only overflight data, the interview data from preceding and following months were combined to estimate the mean daily fishing activity pattern and catch per unit effort. The catch and effort estimates for April are referred to as indirect estimates.

Weighting factors used to estimate the daily fishing activity pattern and mean catch per unit effort were calculated using the equations derived from DPA Consulting Ltd. (1982).

The data obtained from each shift were multiplied by the following weighting factor (W1) to expand for all possible stints at each site. The formula reads:

$$W1_{dij} = \frac{N_d}{n_{dij}} \qquad (1)$$

where N_d is the total number of days of type d in that month and n_{dij} is the number of times the jth work block at the ith site was sampled on type d days.

The interviews aggregrated by work block were multiplied by the weighting factor W2 to expand for all boats that landed in each work block. The formula reads:

$$W2_{dijk} = \frac{L_{dijk}}{I_{dijk}} \qquad (2)$$

where L_{dijk} is the number of boats landed and I_{dijk} is the number of boats interviewed on the kth stint in the jth work block at the ith site on a day type d.

Therefore, the following equations can be used to calculate an unbiased estimate of the total monthly catch ($\hat{C}_{dgr}$), fishing trips ($\hat{T}_{dg}$) and fishing activity in time block $\hat{A}_{dgt}$ for each day type (d) where g is a set of landing sites (i). These formulas read:

Table 2. Description of terms, variables and subscripts used in this report.

DESCRIPTION OF TERMS

Shift/Stint	-	Represents a combination of a day type and landing site which was sampled on a single day. i.e. one sampling stint performed by an interviewer.
Work block	-	Represents one of four possible periods at a particular site of a given day type. Work Block 1 is before 11 AM Work Block 2 is 11 AM - 3 PM Work Block 3 is 3 PM - 7 PM Work Block 4 is after 7 PM
Day type	-	There are two possible day types: weekdays and weekends; holidays are considered to be weekend days.
Time block	-	Each day is divided into 16 time blocks which are: 1) before 7 AM 2) 7:00 - 7:59 AM 3) 8:00 - 8:59 AM . . . 15) 8:00 - 8:59 PM 16) after 9 PM

DESCRIPTION OF VARIABLES

A	-	Number of boats actively fishing
B	-	Number of boats observed on a flight
C	-	Catch
C'	-	Catch of marked salmon
CPE	-	Catch per boat trip
E	-	Effort (estimated total number of boat trips)
I	-	Number of boats interviewed and found to have been fishing
L	-	Number of boats landing
n	-	Number sampled
N	-	Population size from which n samples were observed
P	-	Proportion
T	-	Number of boat trips
V	-	Number found to be marked
W1	-	Weighting factor to expand for all possible stints at each site
W2	-	Weighting factor to expand for all boats that landed in each work block

DESCRIPTION OF SUBSCRIPTS

a	-	age
g	-	a set of landing sites
d	-	day type
i	-	site
j	-	work block
k	-	stint
l	-	landing time block
m	-	month
q	-	the next boat landing at site i and upon interviewing, found to have been fishing(q ranges from 1 to n)
r	-	species
s	-	sub-Statistical Area
t	-	time block
u	-	flight
x	-	region
y	-	annual

$$\hat{C}_{dgr} = \sum_i \sum_j \left[W1_{dij} \sum_k \sum_q \left(W2_{dijk} C_{dijkqr} \right) \right] \qquad (3)$$

$$\hat{T}_{dg} = \sum_i \sum_j \left[W1_{dij} \sum_k \sum_q \left(W2_{dijk} \right) \right] \qquad (4)$$

$$\hat{A}_{dgt} = \sum_i \sum_j \left[W1_{dij} \sum_k \sum_q \left(W2_{dijk} A_{dijkqt} \right) \right] \qquad (5)$$

where C_{dijkqr} is the catch of species r by the qth fishing party, and A_{dijkqt} can equal 0 or 1, thereby indicating whether the qth fishing party was actively fishing in time block t. Thus, the mean monthly catch per unit effort (CPE_{dgr}) measured in terms of numbers of fish kept per completed boat trip, and proportion of daily fishing effort active during the hour of the aerial survey (P_{dgt}) can be calculated with the following equations:

$$CPE_{dgr} = \frac{\hat{C}_{dgr}}{\hat{T}_{dg}} \qquad (6)$$

$$P_{dgt} = \frac{\hat{A}_{dgt}}{\hat{T}_{dg}} \qquad (7)$$

where CPE_{dgr} and P_{dgt} are calculated for each day type (d) and group of landing sites (g). The groups of landing sites reflect geographic areas with similar catch rates and/or activity patterns.

The estimated mean number of boats fishing during the hour of the sport boat count by overflight was calculated for each sub-Statistical Area using the following equation:

$$\bar{B}_{dst} = \frac{\sum_u B_{dstu}}{n_{ds}} \qquad (8)$$

where B_{dstu} is the number of boats observed fishing on flight u at time t, in sub-Statistical Area s for day type d.

The mean sport boat count at the time of the overflight ($\bar{B}_{dst}$) and proportion of daily fishing effort active during the hour of the overflight (P_{dgt}) were used in the following equation to calculate the total fishing effort for sub-Statistical Area s on day type d:

$$E_{ds} = \bar{B}_{dst} \frac{1}{P_{dgt}} N_d \qquad (9)$$

where N_d is the number of type d days in the month. Interview data for the sub-Statistical Areas fished (s) by anglers landing at each of the sites (i) within a landing group (g) were used to select the proportions (P_{dgt}) that are appropriate for each mean boat count ($\bar{B}_{dst}$).

The estimate for total effort by sub-Statistical Area and day type (E_{ds}) and the weighted catch per boat trip for a group of landing sites by day type, area and species (CPE_{dgr}) were used to calculate total catch for each species (r) and each sub-Statistical Area (s).

$$C_{sr} = \sum_{d} (E_{ds} CPE_{dgr}) \qquad (10)$$

The interview data were also used to select the catch per effort estimates (CPE_{dgr}) that should be applied to the effort estimate (E_{ds}) for a specific sub-Statistical Area (s).

2.22 Variance of Total Fishing Effort

The variance for estimates of total fishing effort has two components:

(1) the variance in aerial sport boat counts:

$$S^2_{B_{dst}} = \frac{\sum_u B^2_{dstu} - \frac{\left(\sum_u B_{dstu}\right)^2}{n_{ds}}}{n_{ds}(n_{ds}-1)} \left[\frac{N_d - n_{ds}}{N_d - 1}\right] \qquad (11)$$

where B_{dstu} is the aerial sport boat count at time t during an aerial survey u on a type d day in sub-area s; n_{ds} is the number of aerial surveys in which boats were counted on type d days, in sub-Statistical Area s; and N_d is the total number of type d days in the month.

(2) the variance in the proportion of boats fishing during the hours of the aerial boat counts:

$$S^2_{P_{dgt}} = \frac{P_{dgt}(1 - P_{dgt})}{I_{dg}} \qquad (12)$$

where P_{dgt} is the mean proportion of boats fishing for a group of landing sites g during the hour of the aerial boat count t on type d days, and I_{dg} is the total number of sport fishing boats interviewed. The above formula assumes P_{dgt} is unbiased and normally distributed where the number of interviews is large.

The variances for boat counts ($S^2_{B_{dst}}$) and proportion of boats fishing ($S^2_{P_{dgt}}$) were combined in the following equation to calculate variance for effort:

$$S^2_{E_{ds}} = N^2_d \left(\frac{B^2_{dst}}{P^2_{dgt}} \right) \left(\frac{S^2_{B_{dst}}}{B^2_{dst}} + \frac{S^2_{P_{dgt}}}{P^2_{dgt}} \right) \qquad (13)$$

where $S^2_{E_{ds}}$ is the variance for total effort on type d days in sub-area s, and the formula is the standard formula for the variance of a ratio of two independent random variables.

2.23 Variance of Total Catch

The variance for estimates of total catch had two components: (1) the variance for total effort (presented above), and (2) the variance for catch per boat trip.

The variance for catch per boat trip($S^2_{CPE_{dgr}}$) was calculated using the following equation:

$$S^2_{CPE_{dgr}} = \frac{SS_{CPE_{dgr}} - \frac{\left(S_{CPE_{dgr}}\right)^2}{I_{dg}}}{I_{dg}(I_{dg} - 1)} \qquad (14)$$

where $SS_{CPE_{dgr}}$ is the weighted sum of squares for CPE_{dgr}, and $S_{CPE_{dgr}}$ is the weighted sum for CPE_{dgr}, such that the sum of the weighting factors used to estimate CPE_{dgr} was equal to the number of interviewed boat trips (I_{dg}).

The variance for total effort and the variance in the catch per boat trip for the appropriately grouped landing sites were combined in the following equation to calculate variance for total catch:

$$S^2_{C_{sr}} = \sum_d \left(E^2_{ds} S^2_{CPE_{dgr}} + CPE^2_{dgr} S^2_{E_{ds}} + S^2_{CPE_{dgr}} S^2_{E_{ds}} \right) \qquad (15)$$

which is the standard formula for the variance of the product of two independent random variables, and where $S^2_{C_{sr}}$ is the variance for total number of species r in sub-Statistical Area s.

2.24 Estimation of Marked Chinook and Coho Salmon

Incidence of marked (adipose-clipped) chinook and coho was recorded in each interview. The proportion of marks observed for each region, month and species (P_{xmr}) was calculated as:

$$P_{xmr} = \frac{V_{xmr}}{n_{xmr}} \qquad (16)$$

where V is the number of marked fish observed and n is the number of fish inspected by region(x), month(m) and species (r).

The variance of each proportion was calculated as:

$$S^2_{P_{xmr}} = \frac{P_{xmr}(1 - P_{xmr})}{n_{xmr}} \qquad (17)$$

Monthly catch estimates of marked salmon were calculated as:

$$C'_{xmr} = P_{xmr} C_{xmr} \qquad (18)$$

where C_{xmr} is the estimated catch of species r in region x and month m.

The variance of the marked catch estimates was calculated as:

$$S^2_{C'_{xmr}} = P^2_{xmr} S^2_{C_{xmr}} + C^2_{xmr} S^2_{P_{xmr}} + S^2_{C_{xmr}} S^2_{P_{xmr}} \qquad (19)$$

where $S^2_{C_{xmr}}$ is the variance of the catch estimate of species r in region x and month m.

The estimated annual proportions of marked salmon caught in each region (weighted by the corresponding regional annual catch estimates) were calculated as:

$$P_{xry} = \frac{C'_{xry}}{C_{xry}} \qquad (20)$$

where

$$C'_{xry} = \sum_{m} C'_{xmr} \quad \text{and} \quad C_{xry} = \sum_{m} C_{xmr} \qquad (21)$$

The variance of the annual proportions was calculated as:

$$S^2_{P_{xry}} = \left(\frac{C'_{xry}}{C_{xry}}\right)^2 \left[\frac{S^2_{C'_{xry}}}{(C'_{xry})^2} + \frac{S^2_{C_{xry}}}{(C_{xry})^2}\right] \qquad (22)$$

where $S^2_{C_{xry}}$ is the variance of the annual estimated catch of species r in region x.

2.25 Estimation of Age Composition of Chinook Catch

Scale samples and length measurements were taken in a subsampling program during the interview process. Ages used in this report represent total age of the fish (including both freshwater and oceanic life) according to the Gilbert-Rich (1927) recording convention.

The proportion of chinook at each age and month (P_{am}) was calculated as:

$$P_{am} = \frac{a_m}{n_m} \qquad (23)$$

where a_m represents the number of fish observed at age a during month m, and n_m is the total number of fish biosampled in that month.

The variance of each proportion was calculated as:

$$S^2_{am} = \frac{P_{am}(1 - P_{am})}{n_m} \qquad (24)$$

The catch at age of chinook in each month was calculated as:

$$C_{am} = P_{am} C_m \qquad (25)$$

where C_m is the estimated catch of chinook salmon in a given month m.

The variance of the catch at age estimate was calculated as:

$$S^2_{C_{am}} = P^2_{am} S^2_{C_m} + C^2_m S^2_{P_{am}} + S^2_{C_m} S^2_{P_{am}} \qquad (26)$$

where $S^2_{C_m}$ is the variance of the monthly catch estimate C_m.

The annual catch at age was calculated as:

$$C_{ay} = \sum_m C_{am} \qquad (27)$$

with a variance

$$S^2_{C_{ay}} = \sum_m S^2_{C_{am}} \qquad (28)$$

The annual proportion at age (weighted by monthly catch) was calculated as:

$$P_{ay} = \frac{C_{ay}}{C_y} \qquad (29)$$

with a variance

$$S^2_{P_{ay}} = \left(\frac{C_{ay}}{C_y}\right)^2 \left[\frac{S^2_{C_{ay}}}{(C_{ay})^2} + \frac{S^2_{C_y}}{(C_y)^2}\right] \qquad (30)$$

3.0 RESULTS

3.1 DISTRIBUTION OF SAMPLING EFFORT

Table 3 shows the number of creel survey interviews conducted by month and Statistical Area in 1983, and the number of monthly overflights. A total of 24,756 interviews (20,476 fishing interviews) and 50 overflights were conducted in 1983. The monthly distribution of interviews reflected the monthly distribution of fishing effort (number of boat trips, Table 4, Fig. 3), except in April when no interviews but four aerial surveys were conducted. Interview effort was dramatically reduced during winter months, especially for Statistical Areas 13, 14 and 15 in the northern portion of Strait of Georgia (Table 3). The total fishing interviews represented 3.6% of the estimated total fishing effort for the entire study area (574,257 boat trips, Table 4) and ranged in each Statistical Area from a low of 1.6% of the estimated total fishing effort in Area 13 to a high of 7.8% of the estimated fishing effort in Area 19B+ (Tables 3 and 5). The major reason for this difference was that the Area 19B+ fishing effort was concentrated through a small number of launch ramps allowing for more interviews to be held in a given time period, while the Area 13 fishing effort was distributed over a large number of interview sites.

3.2 SPORT FISHING EFFORT AND CATCH

Tables 4 and 5 summarize the 1983 Strait of Georgia sport fishing effort and catch statistics for each species by month and by Statistical Area, respectively. Fishing effort and catch statistics for each month and Statistical Area combination are provided in Appendix A.

Sport fishermen made 574,257 boat trips during 1983, which represents a 10% decrease in effort from each of the previous two years (Table 1). This change may be best attributed to the depressed economic situation. However, sport fishing effort has shown very similar seasonal trends for each of the years 1981 to 1983 (Fig. 4). Generally, winter effort consisted of about 10,000 boat trips per month. Fishing activity increased rapidly in May and peaked in June, July, and August to about 140,000 boat trips per month. This peak was followed by a sharp decline in October to low winter levels of fishing effort.

Chinook fishing improved in 1983 with anglers taking 198,433 fish (Tables 4 and 5) compared to 163,793 in 1982 (Table 1). Most of the chinook were landed in 1983 during June to October (81% of total, Table 4). Chinook catches were low in May 1983 compared to previous years, but increased steadily through the summer to reach the highest September chinook catch on record (Fig. 5, Table 4). Catch success for chinook (catch per boat trip) was highest during winter months with November/December fishermen averaging one chinook per boat trip (Fig. 6, Table 6). Summer catch success for chinook was higher in 1983 than in the previous three years (Fig. 6). The highest chinook catches were taken in Area 13 (18.6% of total), Area 14 (18.5%) and Area 19 B+ (15.2%) (Table 5).

Table 3. Number of fishing interviews by month and Statistical Area Strait of Georgia, 1983

Month	Statistical Area										Total	Over-flight
	13	14	15	16	17	18	19A	19B+	28	29		
Jan+Feb	25	49	0	90	264	86	137	697	134	117	1599	4
Mar	12	27	0	22	116	52	36	294	54	55	668	4
Apr	0	0	0	0	0	0	0	0	0	0	0	4
May	175	481	34	95	318	39	81	389	73	57	1742	4
Jun	292	1056	70	175	576	62	133	720	126	60	3270	5
Jul	672	843	97	409	480	104	210	1040	462	93	4410	7
Aug	379	594	56	280	477	139	257	1233	406	135	3956	7
Sep	213	272	32	169	188	105	180	412	162	90	1823	7
Oct	107	183	2	161	270	108	190	486	78	53	1638	4
Nov+Dec	36	31	2	237	109	69	60	649	62	117	1370	4
Total	1911	3536	291	1638	2798	764	1284	5920	1557	777	20,476	50

Table 4. Fishing effort and catch by species and month, Strait of Georgia, 1983.

Month		Effort No. Boat Trips	Coho	Chinook	Pink	Other Salmonids[a]	Rock-fish	Lingcod	Dog-fish	Other Finfish
Jan+	Estimate	11979	1824	8057	0	1920	2368	108[b]	43	505
Feb	S.E.	1749	350	1163	0	970	282	28	27	147
Mar	Estimate	16511	3228	9394	0	16	5441	105[b]	47	23882
	S.E.	1103	471	851	0	11	497	20	12	3977
Apr[c]	Estimate	19887	5845	3845	4	1002	12889	2968	105	37293
	S.E.	2376	619	571	2	368	2117	472	17	11176
May	Estimate	40535	32399	6695	31	141	23722	11035	426	3232
	S.E.	3120	4458	585	9	47	2254	1020	105	600
Jun	Estimate	102168	151358	27659	1066	440	31908	12879	1389	2942
	S.E.	5029	8929	1336	106	58	2376	789	169	356
Jul	Estimate	113205	102946	37248	4964	331	39890	15460	747	5900
	S.E.	5363	6200	2171	336	45	2545	1322	122	650
Aug	Estimate	118821	50847	37438	12432	2005	46103	17780	495	11042
	S.E.	4767	3156	1885	705	254	2760	2357	70	930
Sep	Estimate	101140	39510	37637	34632	2076	28981	8048	1064	2253
	S.E.	8983	5323	3298	3892	198	3254	569	254	227
Oct	Estimate	39834	15627	20474	1715	1599	14809	4819	193	6251
	S.E.	4382	2432	3392	599	312	1600	468	35	1602
Nov+	Estimate	10177	447	9986	8	1300	2988	598[b]	9	800
Dec	S.E.	1310	187	2369	6	501	787	178	10	432
Total	Estimate	574257	404031	198433	54852	10830	209099	73800	4518	94100
	S.E.	14073	13529	6387	4016	1239	6588	3125	356	12055

[a] Includes chum, sockeye, steelhead and cutthroat trout.
[b] A total closure for lingcod was in effect from January 1 to April 15, and November 15 to December 31, 1983. Reported figures most likely represent illegal catches by anglers.
[c] Indirect estimate.

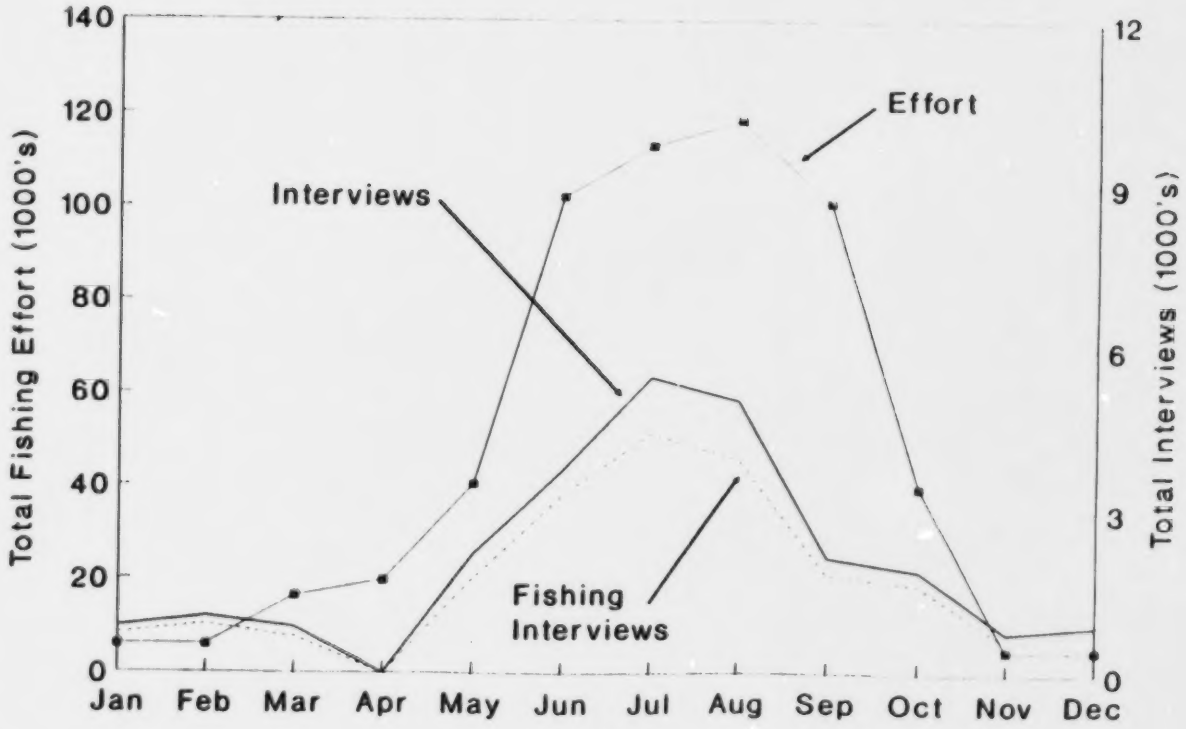

Figure 3. Comparison of monthly total fishing effort, monthly total interviews and monthly total fishing interviews, Strait of Georgia, 1983.

Table 5. Fishing effort and catch by species and Statistical Area, Strait of Georgia, 1983.

Statistical Area		Effort No. Boat Trips	Coho	Chinook	Pink	Other Salmonids[a]	Rockfish	Lingcod	Dogfish	Other Finfish
13	Estimate	122584	122630	36881	18970	1791	37206	16134	345	3337
	S.E.	6209	7164	2227	1573	258	2533	992	78	475
14	Estimate	105692	108262	36797	2011	867	17910	2322	659	1229
	S.E.	9884	8009	4509	378	287	2927	280	92	299
15	Estimate	9941	5968	3050	103	221	3804	1134	80	536
	S.E.	1029	772	380	23	82	418	131	33	198
16	Estimate	57112	73386	16830	494	1239	41954	20048	366	3645
	S.E.	3704	6494	1269	70	324	3447	2717	103	653
17	Estimate	65031	29614	27241	1511	1837	23364	7072	246	38159
	S.E.	3329	2041	1628	133	464	2257	449	40	11218
18	Estimate	44332	3365	15751	50	2229	23601	6330	1244	30111
	S.E.	2171	394	967	16	662	1661	517	260	3693
19A	Estimate	35157	4604	15298	177	1235	10173	3368	105	7933
	S.E.	2270	450	1161	67	782	1203	364	21	1221
19B+	Estimate	75428	41366	30227	30387	672	27117	6419	435	6047
	S.E.	4243	4408	2763	3671	62	2062	497	93	1859
28	Estimate	39848	8579	11279	854	425	14821	6730	633	2151
	S.E.	2153	430	915	88	59	1069	450	93	297
29	Estimate	19132	6257	5079	295	314	9149	4243	405	952
	S.E.	1849	804	583	47	55	1290	503	115	142
Total	Estimate	574257	404031	198433	54852	10830	209099	73800	4518	94100
	S.E.	14073	13529	6387	4016	1239	6588	3125	356	12055

[a] Includes chum, sockeye, steelhead and cutthroat trout.

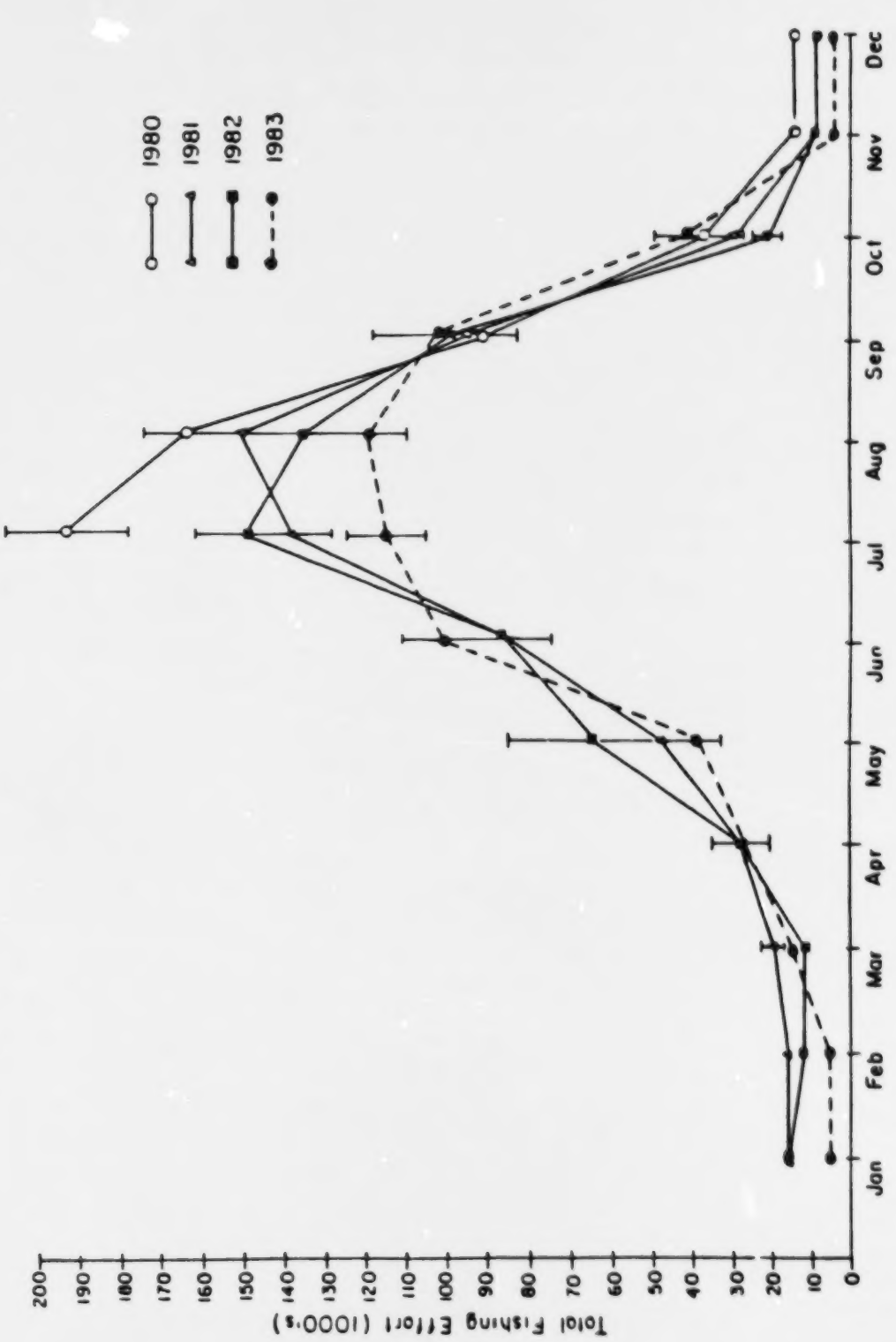

Figure 4. Monthly fishing effort estimates (number of boat trips) for the Strait of Georgia sport fishery, 1980-1983. Bars indicate 95% confidence limits.

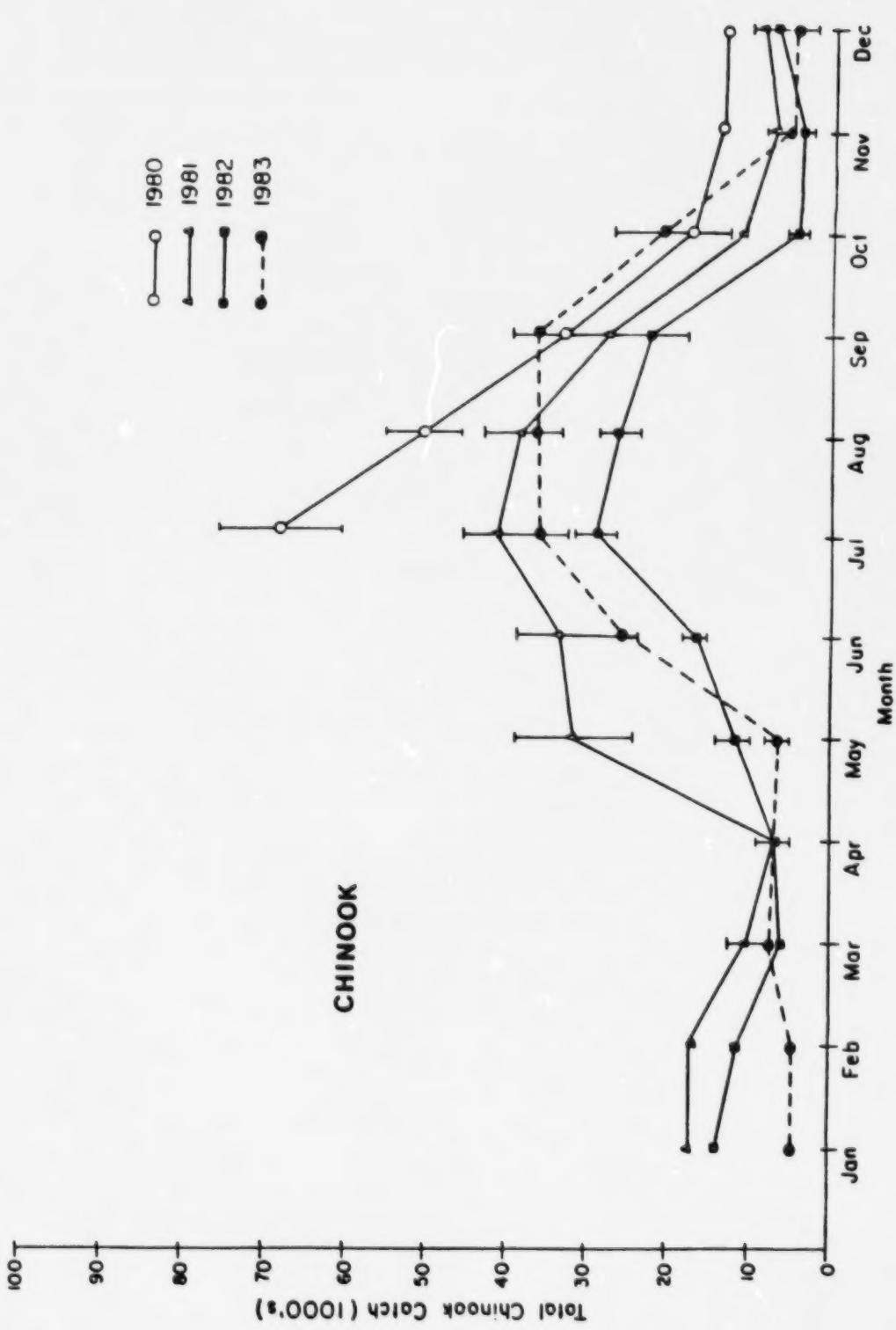

Figure 5. Monthly chinook catch estimates for the Strait of Georgia sport fishery, 1980-1983. Bars indicate 95% confidence limits.

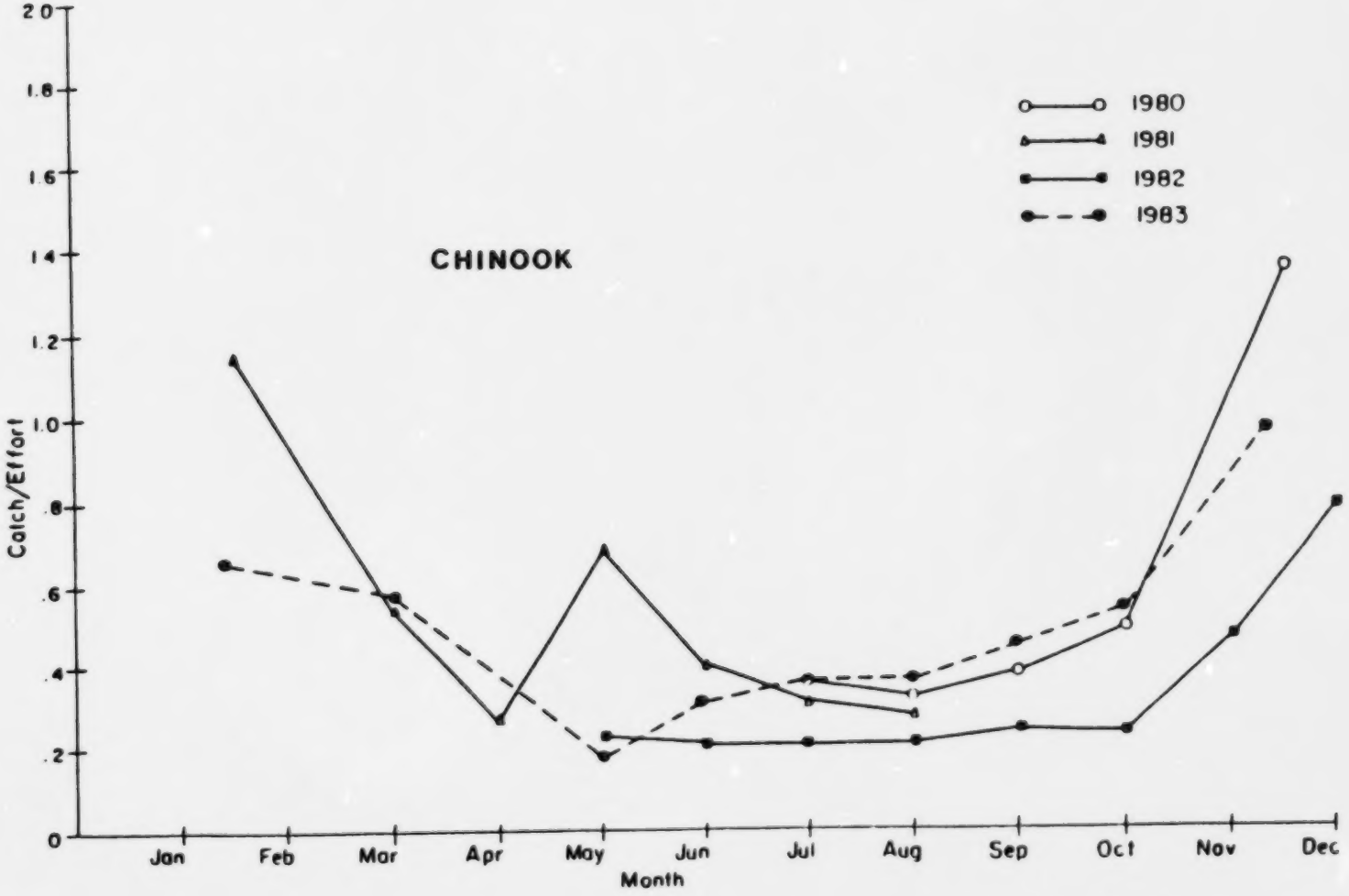

Figure 6. Monthly chinook catch per boat trip for the Strait of Georgia sport fishery, 1980-1983.

Table 6. Monthly catch success (catch per boat trip) by species, Strait of Georgia, 1983[a].

Month	Coho	Chinook	Total Salmonids[b]	Rockfish	Lingcod	Total Non-Salmonids	All Finfish
Jan+Feb	0.15	0.67	0.99	0.20	0.01	0.25	1.24
Mar	0.20	0.57	0.77	0.33	0.01	1.79	2.55
Apr[c]	0.29	0.19	0.54	0.65	0.15	2.68	3.22
May	0.80	0.17	0.97	0.59	0.27	0.95	1.92
Jun	1.48	0.27	1.77	0.31	0.13	0.48	2.25
Jul	0.91	0.33	1.29	0.35	0.14	0.55	1.83
Aug	0.43	0.32	0.86	0.39	0.15	0.63	1.50
Sep	0.39	0.37	1.13	0.29	0.08	0.40	1.52
Oct	0.39	0.51	0.99	0.37	0.12	0.65	1.64
Nov+Dec	0.04	0.98	1.15	0.29	0.06	0.43	1.59
Total	0.70	0.35	1.16	0.36	0.13	0.66	1.83

[a] Calculated using Table 4 data.
[b] Includes chum, sockeye, steelhead and cutthroat trout.
[c] Indirect estimate.

The 1983 coho catch of 404,031 pieces (Tables 4 and 5) represents a 7% decrease from 1982 when approximately 436,000 coho were landed (Table 1). This lower catch parallels the reduced fishing effort observed in 1983 (Fig. 4). Most of the coho were landed in 1983 during summer months, with 93% of the total catch taken during May through September (Table 4). In 1983, coho catches peaked earlier than usual, with the June catch being almost twice as large as in previous years (Fig. 7). However, August/September catches were below normal (Fig. 7). Similarly, coho catch success in 1983 reached a high of 1.5 fish per boat trip in June, then declined rapidly through August (Fig. 8., Table 6). The highest coho catches were taken in Area 13 (30.4% of total), Area 14 (26.8%) and Area 16 (18.2%) (Table 5).

In 1983, Strait of Georgia anglers caught approximately 55,000 pink salmon between June and October (Table 4). Significant pink catches were expected in 1983 because pink salmon returns to Strait of Georgia rivers (primarily the Fraser River) are much greater in odd numbered compared to even numbered years. Campbell River in Area 13, and Victoria to Sooke waters in Area 19+ were responsible for 90% of the pink catch (Table 5).

The landings of other salmonids consisted mainly of chum and sockeye but also included steelhead and cutthroat trout. Statistical Areas 17 and 18 showed the highest catches of other salmonids during 1983 (37.5% of total, Table 5). Most of the annual catch was made in August and September (37.7% of total, Tables 4). A large portion of the other salmonids caught in Area 18 were probably part of a major chum run returning to the Cowichan River.

Certain groundfish species are becoming increasingly popular with sport fishermen, as indicated by the 1983 catches of rockfish (Sebastes spp.) (209,099 pieces), and lingcod (Ophiodon elongatus) (73,800 pieces, Tables 4 and 5). The largest catches of these species in 1983 occurred in Area 16 where 41,954 rockfish and 20,048 lingcod were landed, followed by Area 13 where 37,206 rockfish and 16,134 lingcod were taken. A small sub-survey was conducted in the Campbell River area to determine the species composition of the rockfish caught by anglers. From this survey, 42% of the rockfish landed were identified as quillback (Sebastes maliger) and 35% as copper (Sebastes caurinus). The remaining rockfish were either yelloweye (Sebastes ruberrimus), black (Sebastes melanops) or canary (Sebastes pinniger). The greatest catches of other finfish occurred in Areas 17 and 18, where 68,270 of the total 94,100 other finfish were caught (Table 5). Area 18 also had the largest dogfish (Squalus acanthias) landings with 1,244 fish taken (Table 5).

Rockfish and lingcod, the most frequently caught non-salmonid species, showed the highest catch success (CPE) during April and May 1983, and a relatively constant CPE for the remainder of the year (Table 6). Since spring season has a relatively low catch success for salmon, Strait of Georgia anglers may direct more of their fishing effort toward non-salmonid species during these months.

The average number of salmonids and non-salmonids caught during each boat trip in 1983 was 1.2 and 0.7 respectively (Table 6). The salmonid catch success represents a similar or slightly better catch efficiency compared to 1981 and 1982 when 1.2 and 1.0 fish per boat trip respectively, were reported. Catch success for combined salmonid and non-salmonid finfish during 1983 was 1.8 fish per boat trip (Table 6).

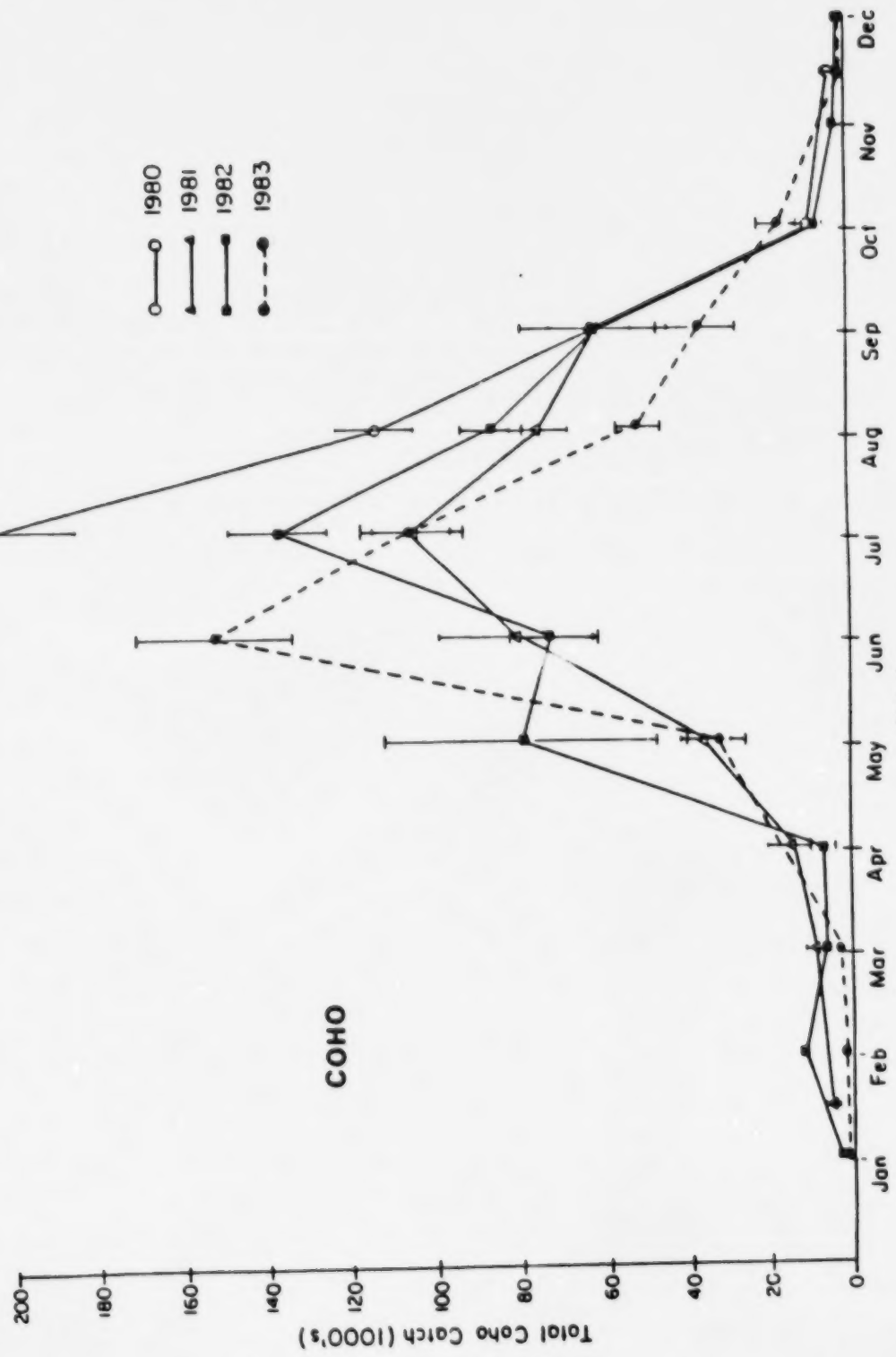

Figure 7. Monthly coho catch estimates for the Strait of Georgia sport fishery, 1980-1983. Bars indicate 95% confidence limits.

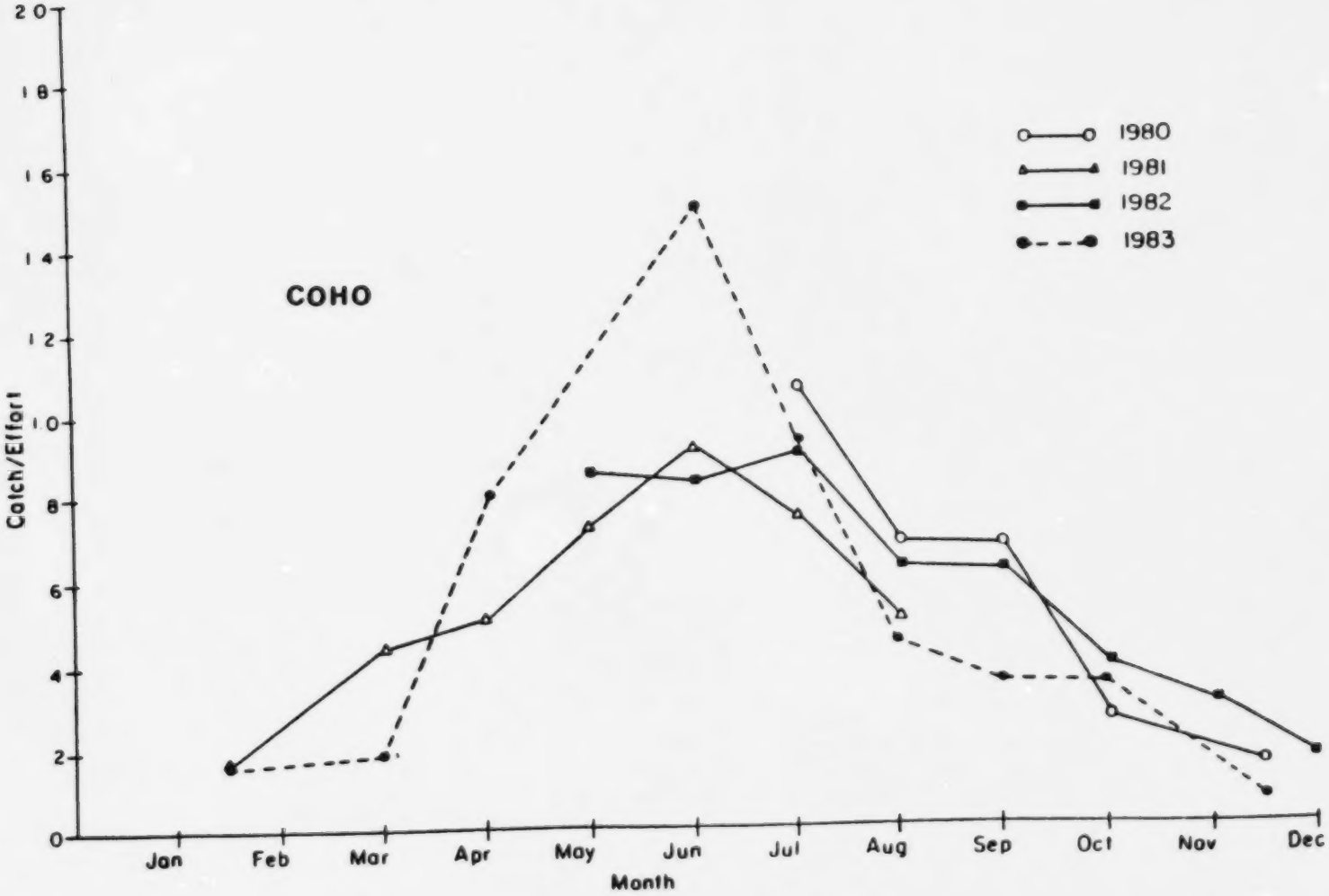

Figure 8. Monthly coho catch per boat trip for the Strait of Georgia sport fishery, 1980-1983.

During the summer months (May - September) in 1983, 67% of the landed chinook were taken in the northern region of Strait of Georgia - Statistical Areas 13 to 17 (Appendix A). The opposite was true in the winter months (January - April, October - December) when 58% of the chinook catch came from the southern region - Statistical Areas 18, 19, 28 and 29. During November and December, 60% of the chinook catch came from Victoria/Sooke waters in Statistical Area 19B+.

Throughout 1983, more salmon were landed and more effort was expended in Area 13 than in any other Statistical Area (Fig. 9, Table 5). Boaters fishing in Area 13 enjoyed an average catch of 1.5 salmon per trip, second only to the catch success in Area 16 where 1.6 salmon were taken per boat trip. Area 14 recorded the greatest number of salmon hooked and released (213,141), with Area 13 next at 201,036 pieces (Appendix A-7). These two areas have major coho fisheries characterized by the release of many sub-legal coho.

3.3 BIOLOGICAL DATA

3.31 Proportion and Catch of Marked Chinook and Coho

In 1983, 8,477 chinook and 13,298 coho were examined for adipose fin clip marks. Tables 7 and 8 show the observed numbers of marked chinook and coho respectively, by month and region. Data were presented by region since some Statistical Areas had insufficient numbers of fish examined for marks in some months, and these data were included with other Areas. Three regions were defined: the North Gulf represented by Areas 13-16; the South Gulf represented by Areas 17, 18, 28, 29 and the Saanich Inlet portion of Area 19 (Area 19A); and Victoria region represented by the remainder of Area 19 (Area 19 B+) (Fig. 1). Among chinook examined for marks, 2.6% had adipose fin clips. The largest observed proportion of chinook marks was in the North Gulf catch (0.042) and the lowest proportion in the Victoria catch (0.017) (Table 7). Among coho examined for marks, 4.2% had adipose fin clips. The largest observed proportion of coho marks was in the South Gulf catch (0.056), and the lowest proportion in the Victoria catch (0.022) (Table 8). Monthly catch estimates of marked chinook and coho are shown by region in Tables 9 and 10 respectively.

3.32 Catch-At-Age for Chinook

During 1983, 1,656 chinook biosamples were collected from 453 shifts for length and age analysis. Table 11 shows the number of chinook observed by age class each month in the sampled fish. The monthly percent age composition is summarized in Figure 10 and Table 12. The monthly age proportions were applied to the estimated monthly chinook catches to provide breakdown by age group (Table 13). In 1983, the majority of chinook sport catch in Strait of Georgia consisted of age 2 fish (57.1%), followed by age 3 (25.5%), age 4 (14.2%) and age 5 or older (3.1%).

Figure 10 and Table 12 show a shift in the age composition of chinook catch between the first five months and the remainder of the year. From January to May the catch was dominated by age 3 and 4 classes, which contributed 92.1% to that period's catch (Table 13). In June, age 2 class strengthened to 39.6%

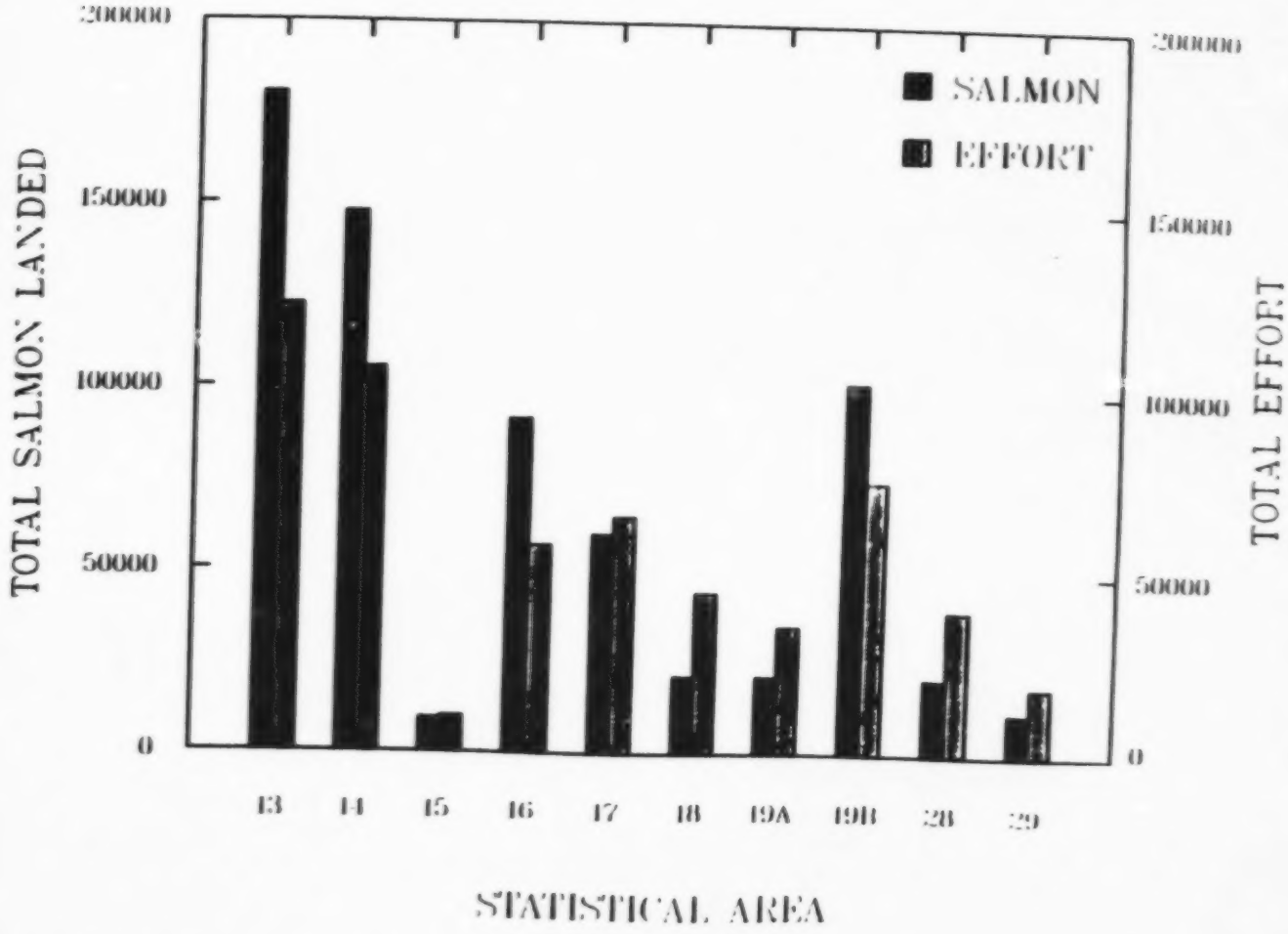

Figure 9. Total salmon landed and total fishing effort expended by Statistical Area in the Strait of Georgia sport fishery, 1983.

Table 7. Monthly number of marked chinook observed by region, Strait of Georgia, 1983.

Month		North Gulf	South Gulf	Victoria	Total Sample
Jan+Feb	Obs[a]	11	12	15	38
	Insp[b]	106	320	769	1195
Mar	Obs	5	2	4	11
	Insp	38	159	246	443
Apr[c]	Obs	3	1	1	5
	Insp	63	35	93	191
May	Obs	8	4	1	13
	Insp	82	78	77	237
Jun	Obs	8	10	8	26
	Insp	275	422	131	828
Jul	Obs	27	19	4	50
	Insp	574	485	126	1185
Aug	Obs	8	16	3	27
	Insp	411	507	183	1101
Sep	Obs	9	7	2	18
	Insp	231	371	141	743
Oct	Obs	7	3	3	13
	Insp	240	220	346	806
Nov+Dec	Obs	0	4	13	17
	Insp	44	178	1060	1748
Total	Obs	86	78	54	218
	Insp	2064	2775	3172	8477
Proportion of marks		0.042	0.028	0.017	0.026

[a] Obs - marks observed.
[b] Insp - fish inspected.
[c] No samples taken in April. Data estimated using 1985-88 average proportions.

Table 8. Monthly number of marked coho observed by region, Strait of Georgia, 1983.

Month		North Gulf	South Gulf	Victoria	Total Sample
Jan+Feb	Obs[a]	1	0	3	4
	Insp[b]	7	193	227	427
Mar	Obs	1	2	1	4
	Insp	18	102	109	229
Apr[c]	Obs	17	0	2	19
	Insp	418	3	56	477
May	Obs	44	21	0	65
	Insp	724	322	20	1066
Jun	Obs	171	26	19	216
	Insp	3469	910	733	5112
Jul	Obs	76	39	31	146
	Insp	1685	400	1405	3490
Aug	Obs	29	44	4	77
	Insp	794	350	222	1366
Sep	Obs	11	8	1	20
	Insp	432	187	63	682
Oct	Obs	1	7	3	11
	Insp	160	155	77	392
Nov+Dec	Obs	0	0	1	1
	Insp	15	19	23	57
Total	Obs	351	147	65	563
	Insp	7722	2641	2935	13298
Proportion of marks		0.045	0.056	0.022	0.042

[a] Obs - marks observed.
[b] Insp - fish inspected.
[c] No samples taken in April. Data estimated using 1985-88 average proportions.

Table 9. Monthly estimated catch of marked chinook by region, Strait of Georgia, 1983[a].

Month		North Gulf	South Gulf	Victoria	Total
Jan+Feb	Catch	169	117	64	350
	S.D.	68	43	23	84
Mar	Catch	282	41	65	388
	S.D.	139	30	33	146
Apr[b]	Catch	40	38	18	96
	S.D.	24	38	20	49
May	Catch	308	136	11	455
	S.D.	112	69	12	133
Jun	Catch	399	289	106	794
	S.D.	142	93	47	176
Jul	Catch	1047	509	63	1619
	S.D.	217	121	32	251
Aug	Catch	439	363	55	857
	S.D.	157	94	32	186
Sep	Catch	642	344	42	1028
	S.D.	243	131	31	278
Oct	Catch	275	92	37	404
	S.D.	142	54	23	154
Nov+Dec	Catch	0	59	74	133
	S.D.	0	33	35	48
Total	Catch	3601	1988	535	6124
	S.D.	456	249	96	527

[a] Calculated using data in Table 7 and Appendix A-3.
[b] No samples taken in April. Data estimated using 1985-88 average proportions.

Table 10. Monthly estimated catch of marked coho by region, Strait of Georgia, 1983[a].

Month		North Gulf	South Gulf	Victoria	Total
Jan+Feb	Catch	37	0	11	48
	S.D.	46	0	7	47
Mar	Catch	27	22	15	64
	S.D.	28	18	15	37
Apr[b]	Catch	193	0	19	212
	S.D.	52	0	16	54
May	Catch	1794	174	0	1968
	S.D.	378	44	0	381
Jun	Catch	6067	540	242	6849
	S.D.	595	117	118	618
Jul	Catch	3217	874	500	4591
	S.D.	447	157	99	484
Aug	Catch	1481	847	64	2392
	S.D.	293	140	32	327
Sep	Catch	750	365	24	1139
	S.D.	264	129	25	295
Oct	Catch	67	183	36	286
	S.D.	70	73	22	104
Nov+Dec	Catch	0	0	5	5
	S.D.	0	0	7	7
Total	Catch	13633	3005	916	17554
	S.D.	929	287	163	986

[a] Calculated using data in Table 8 and Appendix A-2.
[b] No samples taken in April. Data estimated using 1985-88 average proportions.

Table 11. Monthly number of chinook at age sampled in the Strait of Georgia Creel Survey, 1983.

Month	Age 2	Age 3	Age 4	Age 5+	Total
Jan+Feb	1	106	48	1	156
Mar	1	25	7	2	35
Apr[a]	(2)	(21)	(14)	(1)	(38)
May	11	65	44	8	128
Jun	93	63	57	22	235
Jul	110	64	42	10	226
Aug	100	38	16	2	156
Sep	144	14	9	1	168
Oct	173	9	5	1	188
Nov+Dec	149	31	2	1	183
Total[b]	782	415	230	48	1,475[c]
Total[d]	(784)	(436)	(244)	(49)	(1,513)

[a] No data given for April as no samples were taken. Values given in brackets are calculated from the 1985 to 1988 average proportions by month and age (see Appendix B).
[b] Total excluding April estimate.
[c] Of the 1,656 chinook sampled, only 1,475 provided age data.
[d] Total including April estimate.

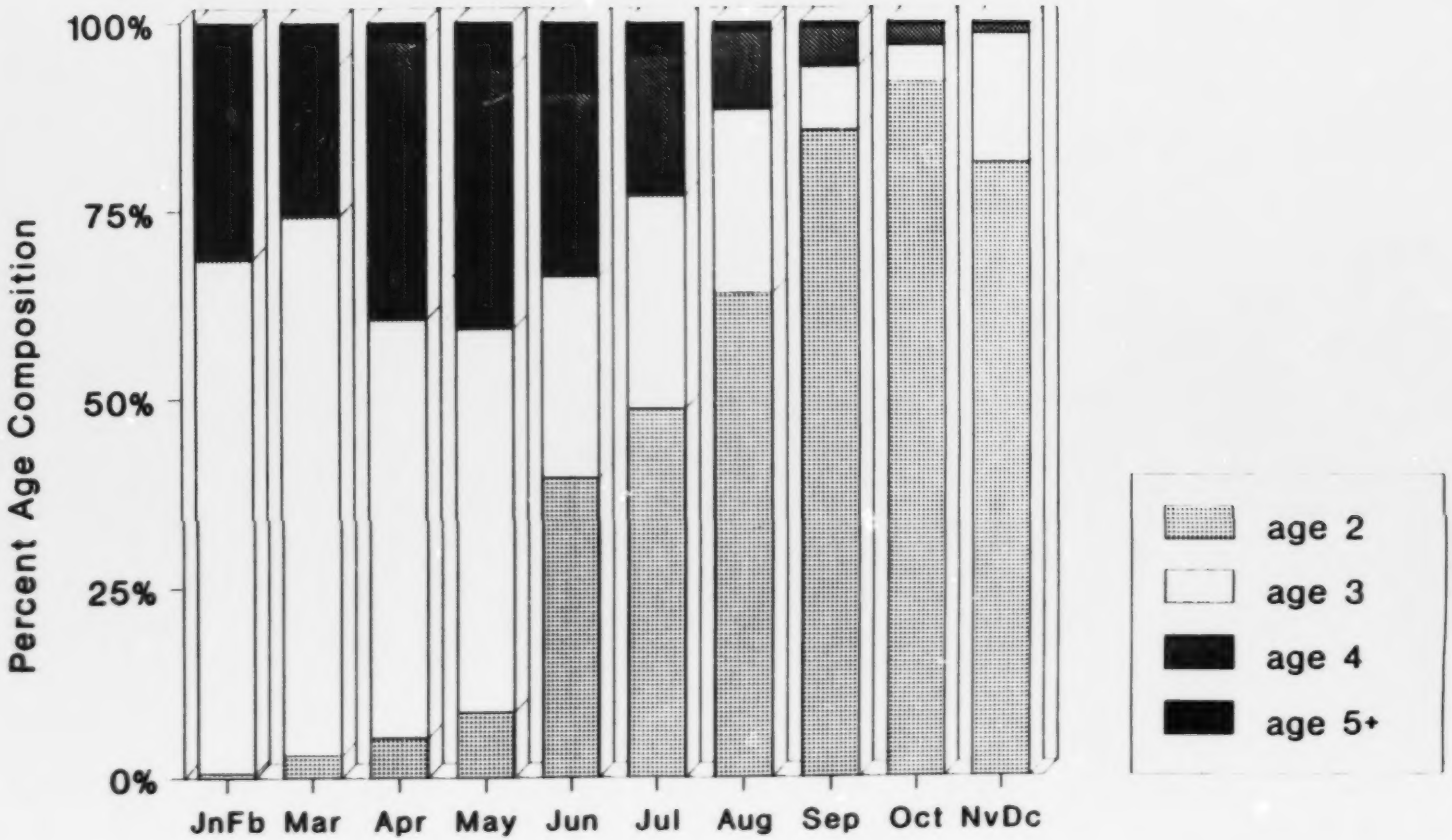

Figure 10. Monthly percent age composition of chinook sampled in the Strait of Georgia Creel Survey, 1983.

Table 12. Monthly percent age composition of chinook in estimated catch in the Strait of Georgia, 1983.[a]

Month	Age 2	Age 3	Age 4	Age 5+
Jan+Feb	0.6	67.9	30.8	0.6
Mar	2.9	71.4	20.0	5.7
Apr[b]	(5.3)	(55.3)	(36.8)	(2.6)
May	8.6	50.8	34.4	6.3
June	39.6	26.8	24.3	9.4
Jul	48.7	28.3	18.6	4.4
Aug	64.1	24.4	10.3	1.3
Sep	85.7	8.3	5.4	0.6
Oct	92.0	4.8	2.7	0.5
Nov+Dec	81.4	16.9	1.1	0.5
Total[c]	57.1	25.5	14.2	3.1

[a] Monthly age composition based on data in Table 11.
[b] No data presented for April as no samples were taken. Values given in brackets are indirect estimates (see Table 11).
[c] Overall age composition based on data in Table 13.

Table 13. Monthly estimated catch at age of chinook in the Strait of Georgia, 1983[a].

Month		Age 2	Age 3	Age 4	Age 5+	Total[b]
Jan+Feb	Catch	52	5474	2479	52	8057
	S.D.	53	847	467	53	970
Mar	Catch	268	6710	1879	537	9394
	S.D.	267	942	660	373	1238
Apr[c]	Catch	(204)	(2126)	(1415)	(100)	3845
	S.D.	-	-	-	-	571
May	Catch	575	3401	2301	418	6695
	S.D.	174	420	346	148	590
Jun	Catch	10946	7415	6709	2589	27659
	S.D.	1029	877	839	541	1681
Jul	Catch	18130	10548	6922	1648	37248
	S.D.	1630	1276	1046	519	2377
Aug	Catch	23998	9120	3840	480	37438
	S.D.	1880	1368	931	339	2527
Sep	Catch	32261	3136	2016	224	37637
	S.D.	3007	851	680	225	3206
Oct	Catch	18840	980	545	109	20474
	S.D.	3148	362	260	112	3181
Nov+Dec	Catch	8130	1692	109	55	9986
	S.D.	1951	492	83	57	2015
Total[e]	Catch	113404	50602	28215	6212	198433
	S.D.	5488	2673	1994	952	6361[d]
Overall Age Composition[e]		57.1%	25.5%	14.2%	3.1%	100%

[a] Calculated by applying to total catch the monthly age proportions from Table 11.

[b] Monthly total catch from Table 4.

[c] No data presented for April as no samples were taken. Values given in brackets are indirect estimates (see Table 11).

[d] S.E.

[e] Total catch at age and overall age composition include April estimates.

and remained the dominant age class for the remainder of the year with monthly contributions ranging between 48.7% and 92.0% (Table 12). The high proportion of age 2 chinook in June to December catches may be the result of 1) poorer than usual age 3 catches in the fall or 2) stronger than usual age 2 recruitment to the sport fishery. The latter is consistent with the findings of Argue et al.(1983) which show that age 2 chinook generally reach the minimum legal size limit of 45 cm in July.

3.33 Mean Length-At-Age for Chinook

Table 14 shows the mean nose-fork length by age for the 1,436 chinook for which both length and age data were available. These data are summarized graphically in Figure 11. The largest portion of measured chinook (678 fish or 47% of the total sample) were in the 45-54 cm length category. This is consistent with the large catch of age 2 fish (Table 13) which were found to have an annual mean length of 49.1 cm (Table 14). Of the total sample, 101 fish or 7% were sub-legal in size (less than 45 cm). The majority of these were landed at Brechin Point (34 fish) and Westview (21 fish). The largest chinook sampled were two fish each measuring 99 cm; one was landed at Flemming Beach on July 16 and the other at Cheanuh Marina on September 9.

4.0 SUMMARY

The sport fishery creel survey was conducted in the Strait of Georgia in 1983 in order to estimate the catches of all important recreational finfish species and the total sport fishing boat trips. The number of chinook and coho salmon with adipose fin clips were also estimated. These data are presented by month and Statistical Area. Monthly age and length composition of chinook catch are also shown.

In 1983, a total of 24,756 boating parties were interviewed at 31 landing locations in the Strait of Georgia survey area. This sampling represents approximately 4% of the total number of boat trips conducted by sport fishermen in the Strait of Georgia in 1983. A total of 50 overflights were also conducted to take "snapshot" counts of fishing effort.

In 1983, sports fisherman landed an estimated 668,000 salmonids during 574,257 boat trips in Strait of Georgia; an additional 776,000 salmon were released by anglers. Landed salmon were identified as: 404,000 coho, 198,000 chinook, 55,000 pink salmon and 11,000 other salmonids (mainly chum, but also some sockeye, cutthroat, and steelhead trout). Ninety-five percent confidence limits for total catches of coho and chinook, and total fishing effort were within 7% of the corresponding estimated totals.

Among salmon examined for marks, 2.7% of chinook and 4.3% of coho had adipose fin clips. The majority of chinook sport catch in 1983 consisted of age 2 fish (57.1%), followed by age 3 (25.5%), age 4 (14.2%) and age 5 or older (3.1%). Of the total chinook measured in 1983, 47% were 45-54 cm long, while 7% were sub-legal in size (<45 cm).

The total groundfish catch was 382,000 pieces or 36% of all finfish. Grounfish catches consisted of 209,000 rockfish, 74,000 lingcod, 4,500 dogfish and 94,000 other finfish.

Table 14. Monthly mean nose-fork length (L) at age of chinook sampled in the Strait of Georgia Creel Survey, 1983 (n gives sample size).

Month	Age 2		Age 3		Age 4		Age 5		Age 6		Total Sampled
	L (cm)	n	L(cm)	n	L(cm)	n	L(cm)	n	L(cm)	n	
J/F	-	0	56.5	93	66.9	46	83.0	1	-	0	140
Mar	46.0	1	57.5	23	66.9	7	84.0	2	-	0	33
Apr[a]	-	0	-	0	-	0	-	0	-	0	0
May	38.6	10	57.9	65	74.5	44	82.8	8	-	0	127
Jun	45.1	91	60.0	60	75.7	56	85.7	21	97.0	1	229
Jul	46.9	108	63.9	64	79.3	42	85.1	9	94.0	1	224
Aug	49.1	97	63.9	38	80.8	16	84.5	2	-	0	153
Sep	49.9	141	64.4	14	86.4	9	99.0	1	-	0	165
Oct	49.8	169	61.3	9	70.0	5	79.0	1	-	0	184
N/D	52.0	148	60.7	31	74.5	2	-	0	-	0	181
Total	49.1	765	58.8	397	74.3	227	84.5	45	95.5	2	1436

[a] No lengths presented for April as no samples were taken.

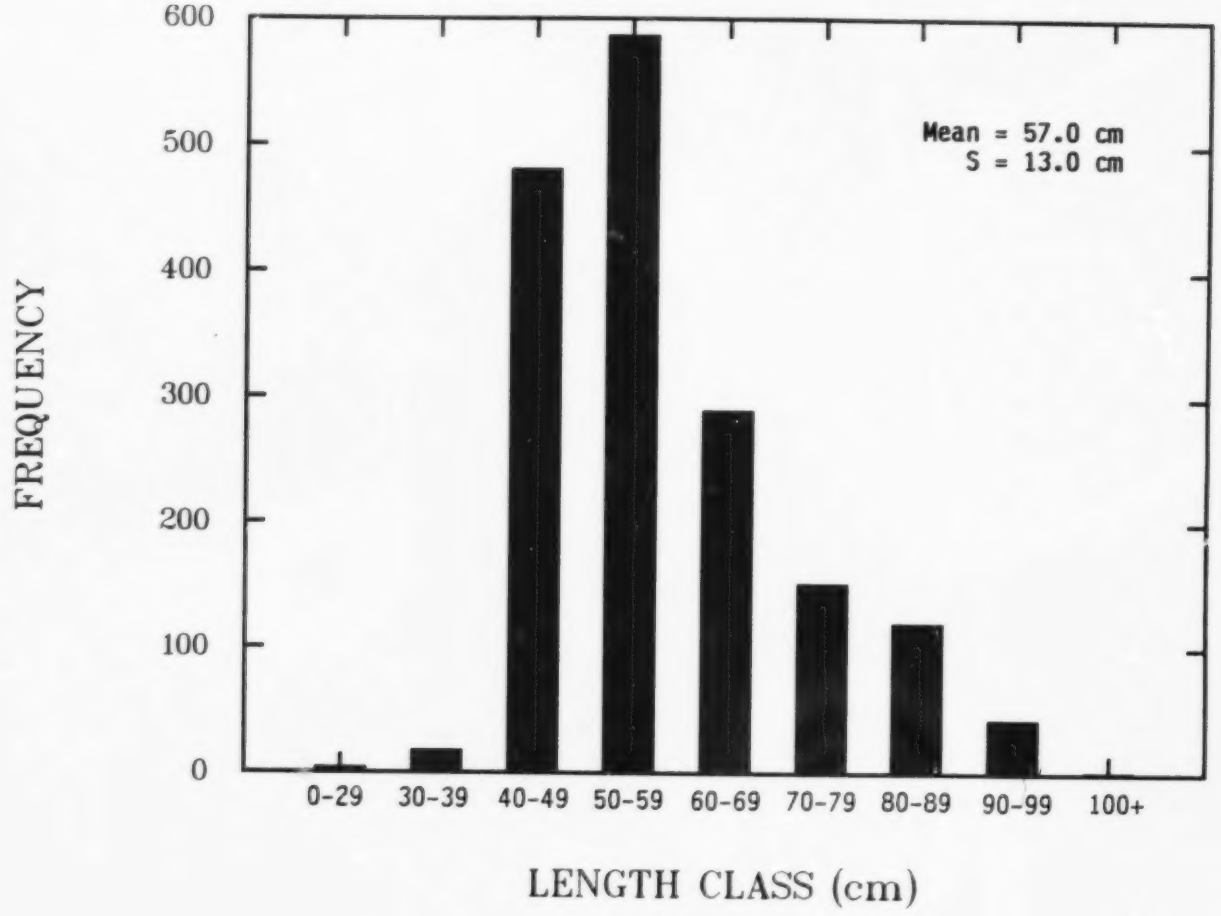

Figure 11. Length frequency distribution of chinook sampled in the Strait of Georgia Creel Survey, 1983.

5.0 ACKNOWLEDGMENTS

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APPENDIX A

Catch and Effort Statistics by Month and Statistical Area
for Strait of Georgia, 1983.

APPENDIX A-1. STRAIT OF GEORGIA FISHING EFFORT (NO. BOAT TRIPS), 1983.

		Statistical Area										
Month		13	14	15	16	17	18	19A	19B+	28	29	Total
Jan+Feb		757	1101	130	1206	1040	712	881	2624	2767	761	11979
	S.E.	324	299	132	405	462	86	314	680	1324	387	1749
Mar		1261	751	318	1204	1932	1797	1084	4807	2641	716	16511
	S.E.	389	153	198	317	496	363	136	449	524	174	1103
Apr[a]		780	1450	174	1677	6647	1353	1005	3907	2432	462	19887[a]
	S.E.	393	156	143	308	1949	245	196	1066	544	141	2376
May		4488	6304	429	6826	6631	3214	2741	4166	3221	2515	40535
	S.E.	967	1062	162	1401	619	532	1038	1344	708	1277	3120
June		24549	24303	1905	10918	11716	5855	4503	9587	5778	3054	102168
	S.E.	2331	2736	577	1111	1284	862	676	2642	495	854	5029
Jul		34671	18769	2963	10534	8954	10007	6355	12918	4291	3743	113205
	S.E.	3970	1944	448	2060	836	1187	1135	1042	412	360	5363
Aug		32497	15068	2416	13313	10278	9348	7958	17341	8835	1767	118821
	S.E.	2861	2076	571	2172	1393	740	774	1165	694	504	4767
Sep		15926	28053	1079	7524	11658	7263	7224	12562	6269	3582	101140
	S.E.	1954	8275	262	937	1112	965	1002	1875	701	517	8983
Oct		6728	9439	488	2688	5244	4110	2487	4585	1959	2106	39834
	S.E.	1982	3505	163	506	907	746	549	798	436	447	4382
Nov+Dec		927	454	39	1222	931	673	919	2931	1655	426	10177
	S.E.	291	298	4	263	308	206	521	907	482	99	1310
Total		122584	105692	9941	57112	65031	44332	35157	75428	39848	19132	574257
	S.E.	6209	9884	1029	3704	3329	2171	2270	4243	2153	1849	14073

[a]Indirect estimate.

APPENDIX A-2. STRAIT OF GEORGIA COHO CATCH SUMMARY, 1983.

Month		Statistical Area 13	14	15	16	17	18	19A	19B+	28	29	Total
Jan+Feb	Catch	0	258	0	0	65	0	652	849	0	0	1824
	S.E.	0	160	0	0	55	0	255	169	0	0	350
Mar	Catch	0	481	0	0	826	0	290	1631	0	0	3228
	S.E.	0	138	0	0	393	0	50	214	0	0	471
Apr[a]	Catch	165	1354	108	3121	0	0	111	537	350	99	5845[a]
	S.E.	63	154	93	544	0	0	27	199	93	39	619
May	Catch	2876	7803	318	18516	890	254	112	220	615	795	32399
	S.E.	725	1540	130	4102	144	66	41	65	128	300	4458
June	Catch	43892	50577	2168	26450	13837	1412	209	9354	2022	1437	151358
	S.E.	3918	5417	659	3997	1715	329	46	3924	209	372	8929
Jul	Catch	36713	17409	1925	15278	4501	53	953	22654	1274	2186	102946
	S.E.	4936	1783	220	2536	562	25	173	1928	130	581	6200
Aug	Catch	20749	10810	1116	7863	2253	165	496	3573	3064	758	50847
	S.E.	2132	1539	283	1600	436	27	75	265	278	246	3156
Sep	Catch	10456	16580	315	2103	4729	833	1519	1527	855	593	39510
	S.E.	1271	5115	91	289	505	162	300	269	106	94	5323
Oct	Catch	7742	2845	18	55	2472	618	234	912	342	389	15627
	S.E.	2219	789	11	25	532	123	67	224	87	94	2432
Nov+Dec	Catch	37	145	0	0	41	30	28	109	57	0	447
	S.E.	27	156	0	0	19	16	22	76	54	0	187
Total	Catch	122630	108262	5968	73386	29614	3365	4504	41366	8579	6257	404031
	S.E.	7164	8009	772	6494	2041	394	450	4408	430	804	13529

[a]Indirect estimate.

APPENDIX A-3. STRAIT OF GEORGIA CHINOOK CATCH SUMMARY, 1983.

Month		Statistical Area 13	14	15	16	17	18	19A	19B+	28	29	Total
Jan+Feb	Catch	697	134	148	646	875	342	226	3302	1387	300	8057
	S.E.	353	52	152	225	350	73	100	802	590	151	1163
Mar	Catch	1431	230	250	234	1567	125	105	4006	983	463	9394
	S.E.	469	90	175	102	450	27	21	398	276	128	851
Apr[a]	Catch	187	157	24	471	207	243	158	1671	598	129	3845[a]
	S.E.	96	26	21	97	33	77	30	530	128	38	571
May	Catch	831	560	31	1731	616	483	450	885	591	517	6695
	S.E.	184	111	19	373	86	126	156	172	97	264	585
June	Catch	4449	3290	528	5448	3766	1324	1356	1729	4162	1607	27659
	S.E.	432	480	161	719	418	264	224	463	374	419	1336
Jul	Catch	12917	6498	570	2279	4339	4446	3045	2000	587	567	37248
	S.E.	1622	859	69	521	553	587	619	166	60	65	2171
Aug	Catch	11825	6950	612	3175	3905	3435	3324	3381	622	209	37438
	S.E.	1184	886	153	664	759	319	377	264	72	77	1885
Sep	Catch	2753	12459	342	926	8145	3885	5157	2929	605	436	37637
	S.E.	365	2979	94	141	815	567	753	527	79	74	3298
Oct	Catch	1043	6292	452	1648	3441	1211	1034	4305	455	593	20474
	S.E.	313	3104	164	355	744	232	265	947	113	177	3392
Nov+Dec	Catch	748	227	93	272	380	257	443	6019	1289	258	9986
	S.E.	351	208	15	156	205	128	316	2244	469	83	2369
Total	Catch	36881	36797	3050	16830	27241	15751	15298	30227	11279	5079	198433
	S.E.	2227	4509	380	1269	1628	967	1161	2763	915	583	6387

[a]Indirect estimate.

APPENDIX A-4. STRAIT OF GEORGIA PINK CATCH SUMMARY, 1983.

		Statistical Area										
Month		13	14	15	16	17	18	19A	19B+	28	29	Total
Jan+Feb	Catch	0	0	0	0	0	0	0	0	0	0	0
	S.E.	0	0	0	0	0	0	0	0	0	0	0
Mar	Catch	0	0	0	0	0	0	0	0	0	0	0
	S.E.	0	0	0	0	0	0	0	0	0	0	0
Apr[a]	Catch	0	4	0	0	0	0	0	0	0	0	4[a]
	S.E.	0	2	0	0	0	0	0	0	0	0	2
May	Catch	0	31	0	0	0	0	0	0	0	0	31
	S.E.	0	9	0	0	0	0	0	0	0	0	9
June	Catch	368	610	0	0	54	0	0	34	0	0	1066
	S.E.	56	88	0	0	10	0	0	19	0	0	106
Jul	Catch	2069	180	12	325	236	11	165	1863	44	59	4964
	S.E.	441	29	3	61	34	10	67	210	12	26	336
Aug	Catch	4453	378	63	67	427	0	12	6378	575	79	12432
	S.E.	472	60	21	28	93	0	7	504	76	22	705
Sep	Catch	10790	808	28	102	431	39	0	22042	235	157	34632
	S.E.	1355	361	10	21	55	12	0	3630	42	32	3892
Oct	Catch	1290	0	0	0	358	0	0	67	0	0	1715
	S.E.	595	0	0	0	68	0	0	22	0	0	599
Nov+Dec	Catch	0	0	0	0	5	0	0	3	0	0	8
	S.E.	0	0	0	0	4	0	0	4	0	0	6
Total	Catch	18970	2011	103	494	1511	50	177	30387	854	295	54852
	S.E.	1573	378	23	70	133	16	67	3671	88	47	4016

[a]Indirect estimate.

APPENDIX A-5. STRAIT OF GEORGIA CATCH SUMMARY FOR OTHER SALMONIDS, 1983[a].

Month		Statistical Area 13	14	15	16	17	18	19A	19B+	28	29	Total
Jan+Feb	Catch	0	0	0	0	0	937	983	0	0	0	1920
	S.E.	0	0	0	0	0	576	781	0	0	0	970
Mar	Catch	0	0	0	0	16	0	0	0	0	0	16
	S.E.	0	0	0	0	11	0	0	0	0	0	11
Apr[b]	Catch	0	0	0	0	896	76	28	0	2	0	1002[b]
	S.E.	0	0	0	0	367	30	9	0	2	0	368
May	Catch	0	44	0	0	0	13	47	0	20	17	141
	S.E.	0	34	0	0	0	6	27	0	10	13	47
June	Catch	0	155	9	11	187	0	9	69	0	0	440
	S.E.	0	35	5	3	35	0	5	30	0	0	58
Jul	Catch	38	49	21	71	0	0	13	129	4	6	331
	S.E.	9	13	6	37	0	0	8	18	2	3	45
Aug	Catch	1205	7	191	18	47	0	145	320	65	7	2005
	S.E.	234	5	82	11	13	0	37	37	13	2	254
Sep	Catch	350	136	0	592	156	149	0	147	294	252	2076
	S.E.	70	29	0	149	26	64	0	36	55	49	198
Oct	Catch	198	343	0	344	87	581	10	0	30	6	1599
	S.E.	82	161	0	208	24	144	7	0	13	5	312
Nov+Dec	Catch	0	133	0	203	448	473	0	7	10	26	1300
	S.E.	0	230	0	195	279	285	0	5	8	21	501
Total	Catch	1791	867	221	1239	1837	2229	1235	672	425	314	10830
	S.E.	258	287	82	324	464	662	782	62	59	55	1239

[a] Includes chum, sockeye, steelhead and cutthroat trout.

[b] Indirect estimate.

APPENDIX A-6. STRAIT OF GEORGIA CATCH SUMMARY FOR TOTAL SALMONIDS, 1983.[a]

		Statistical Area										
Month		13	14	15	16	17	18	19A	19B+	28	29	Total
Jan+Feb	Catch	697	392	148	646	940	1279	1861	4151	1387	300	11801
	S.E.	353	181	152	225	397	622	1100	962	590	151	1811
Mar	Catch	1431	712	250	234	2409	125	395	5637	983	463	12639
	S.E.	469	184	175	102	827	27	59	570	276	128	1183
Apr[b]	Catch	352	1516	131	3592	1103	319	296	2209	950	228	10696[b]
	S.E.	156	171	112	619	368	83	59	723	207	69	1079
May	Catch	3707	8438	349	20246	1506	750	609	1105	1227	1329	39266
	S.E.	862	1633	145	4426	225	166	214	227	2221	544	4852
June	Catch	48710	54632	2704	31909	17844	2736	1574	11186	6183	3043	180521
	S.E.	4325	5924	821	4584	2111	563	259	4387	544	769	10023
Jul	Catch	51736	24136	2528	17954	9076	4511	4176	26647	1909	2818	145491
	S.E.	6728	2570	286	3061	1136	588	807	2266	186	650	8319
Aug	Catch	38233	18145	1981	11123	6632	3599	3976	13653	4325	1053	102720
	S.E.	3729	2395	492	2227	1287	334	444	1000	381	336	5298
Sep	Catch	24349	29983	685	3722	13460	4906	6676	26644	1989	1438	113852
	S.E.	2917	8357	191	455	1359	729	1015	4314	217	218	10035
Oct	Catch	10273	9480	470	2048	6357	2410	1279	5284	827	988	39416
	S.E.	2993	3971	173	455	1316	469	325	1172	189	244	5338
Nov+Dec	Catch	785	504	93	475	874	760	471	6139	1355	284	11740
	S.E.	354	483	15	250	354	317	317	2277	480	83	2484
Total	Catch	180273	147938	9339	91949	60201	21395	21313	102655	21135	11944	668142
	S.E.	9828	11664	1073	7473	3484	1431	1848	7237	1142	1258	19039

[a] Includes coho, chinook, pink, chum, sockeye, steelhead and cutthroat trout.
[b] Indirect estimate.

APPENDIX A-7. STRAIT OF GEORGIA CATCH SUMMARY FOR RELEASED SALMON, 1983.

Month		Statistical Area 13	14	15	16	17	18	19A	19B+	28	29	Total
Jan+Feb	Catch	488	743	3	7	193	127	681	4755	604	310	7911
	S.E.	414	158	4	7	144	44	374	1001	308	124	1213
Mar	Catch	1266	152	0	0	362	473	531	4952	327	181	8244
	S.E.	625	46	0	0	181	86	88	642	123	57	933
Apr[a]	Catch	108	230	9	1132	557	128	516	1467	122	27	4296[a]
	S.E.	60	34	7	301	168	29	103	619	36	11	721
May	Catch	322	1179	20	3510	233	45	998	316	53	216	6892
	S.E.	70	360	10	865	50	19	355	152	12	76	1020
June	Catch	6408	7854	630	6198	4212	847	723	954	1438	544	29808
	S.E.	880	1267	215	1104	476	156	115	335	172	118	2016
Jul	Catch	54130	18917	2695	2578	12552	2675	4312	16186	1407	1065	116517
	S.E.	8168	1917	323	574	1318	375	1057	1329	163	99	8696
Aug	Catch	65759	10718	4643	3636	30019	6780	8576	23283	4228	759	158401
	S.E.	5952	1704	1094	895	5830	648	885	1771	397	254	8881
Sep	Catch	60481	134494	2739	15703	39272	14617	20979	18752	6941	3552	317530
	S.E.	7838	40993	703	2005	4106	2193	3405	3181	943	571	42320
Oct	Catch	11854	37112	1241	6928	17944	6826	5675	15460	4048	3514	110602
	S.E.	3729	12629	408	1408	3194	1525	1512	3459	1107	752	14287
Nov+Dec	Catch	220	1742	33	942	1192	576	1226	6143	2614	613	15301
	S.E.	103	1445	9	445	476	333	727	2257	917	181	3022
Total	Catch	201036	213141	12013	40634	106536	33094	44217	92268	21782	10781	775502
	S.E.	13373	43016	1417	3064	7958	2800	4075	5832	1811	1018	46548

[a] Indirect estimate.

APPENDIX A-8. STRAIT OF GEORGIA ROCKFISH CATCH SUMMARY, 1983.

		Statistical Area										
Month		13	14	15	16	17	18	19A	19B+	28	29	Total
Jan+Feb	Catch	26	147	10	130	125	780	362	464	294	30	2368
	S.E.	29	48	12	61	79	155	127	78	140	17	282
Mar	Catch	0	115	0	219	132	2061	600	1607	617	90	5441
	S.E.	0	58	0	122	74	346	121	265	132	33	497
Apr[a]	Catch	71	211	3	1064	7113	991	523	2118	671	124	12889[a]
	S.E.	29	27	3	215	2039	189	114	445	172	36	2117
May	Catch	619	881	56	5077	5314	3145	2185	2852	2068	1525	23722
	S.E.	154	163	24	1261	568	550	913	945	576	870	2254
June	Catch	6550	2758	340	6367	4050	3867	1483	3224	1432	1837	31908
	S.E.	1068	344	117	1045	539	1174	237	990	261	713	2376
Jul	Catch	10293	2912	1519	10234	1184	5109	2003	3420	1575	1641	39890
	S.E.	1224	313	265	1993	156	637	459	336	184	225	2545
Aug	Catch	14449	3120	1220	10544	1779	4176	1731	3600	4526	958	46103
	S.E.	1711	587	267	1851	378	469	218	373	465	288	2760
Sep	Catch	3560	7443	529	5963	2341	1912	594	3886	1776	977	28981
	S.E.	662	2819	131	1089	246	422	104	764	351	216	3254
Oct	Catch	1507	323	119	1657	1017	1267	291	5211	1680	1737	14809
	S.E.	606	163	43	647	196	226	70	1085	534	435	1600
Nov+Dec	Catch	131	0	8	699	309	293	401	735	182	230	2988
	S.E.	142	0	3	363	210	212	490	307	135	160	787
Total	Catch	37206	17910	3804	41954	23364	23601	10173	27117	14821	9149	209099
	S.E.	2533	2927	418	3447	2257	1661	1203	2062	1069	1290	6588

[a]Indirect estimate.

APPENDIX A-9. STRAIT OF GEORGIA LINGCOD CATCH SUMMARY, 1983.

Month		Statistical Area										Total
		13	14	15	16	17	18	19A	19B+	28	29	
Jan+Feb	Catch	0	0	0	0	0	35	11	62	0	0	108[a]
	S.E.	0	0	0	0	0	19	8	18	0	0	28
Mar	Catch	0	0	0	0	0	0	0	105	0	0	105[a]
	S.E.	0	0	0	0	0	0	0	20	0	0	20
Apr[b]	Catch	575	0	21	458	647	86	169	757	215	40	2968[b]
	S.E.	342	0	21	88	226	24	39	195	69	18	471
May	Catch	2018	184	99	2785	1950	710	725	1191	764	609	11035
	S.E.	422	97	40	681	224	162	299	279	209	318	1020
June	Catch	3750	787	187	1987	1616	1143	687	1077	1024	621	12879
	S.E.	447	165	63	348	231	233	112	291	148	209	789
Jul	Catch	3698	448	297	5391	575	1107	397	1046	1241	1260	15460
	S.E.	458	59	49	1194	90	172	84	125	142	157	1322
Aug	Catch	3714	274	212	8424	427	847	598	1131	1670	483	17780
	S.E.	346	73	58	2309	89	121	91	101	167	169	2357
Sep	Catch	1609	432	293	882	1149	1326	588	371	1041	357	8048
	S.E.	317	132	73	173	120	323	109	86	170	60	569
Oct	Catch	770	197	24	119	574	788	169	594	712	872	4819
	S.E.	243	124	10	47	106	122	37	100	230	227	468
Nov+Dec	Catch	0	0	1	2	134	288	24	85	63	1	598[a]
	S.E.	0	0	1	2	70	150	16	44	47	1	178
Total	Catch	16134	2322	1134	20048	7072	6330	3368	6419	6730	4243	73800
	S.E.	992	280	131	2717	449	517	364	497	450	503	3125

[a] A total closure for lingcod was in effect from January 1 to April 15, and November 15 to December 31, 1983; see Table 4 footnote.

[b] Indirect estimate.

APPENDIX A-10. STRAIT OF GEORGIA DOGFISH CATCH SUMMARY, 1983.

		Statistical Area										
Month		13	14	15	16	17	18	19A	19B+	28	29	Total
Jan+Feb	Catch	0	0	0	3	24	0	4	0	12	0	43
	S.E.	0	0	0	4	23	0	4	0	12	0	27
Mar	Catch	0	0	0	0	0	0	0	47	0	0	47
	S.E.	0	0	0	0	0	0	0	12	0	0	12
Apr[a]	Catch	0	42	0	0	18	21	1	6	14	3	105[a]
	S.E.	0	8	0	0	7	8	0	3	10	3	17
May	Catch	7	102	0	0	0	67	16	8	122	104	426
	S.E.	4	36	0	0	0	21	8	6	58	76	105
June	Catch	31	97	0	214	113	249	73	33	344	235	1389
	S.E.	9	21	0	72	20	100	18	11	67	86	169
Jul	Catch	216	162	75	145	0	0	0	71	38	40	747
	S.E.	72	53	33	74	0	0	0	16	8	8	122
Aug	Catch	0	256	5	4	0	71	11	60	79	9	495
	S.E.	0	62	2	3	0	22	6	14	19	3	70
Sep	Catch	91	0	0	0	0	776	0	168	16	13	1064
	S.E.	28	0	0	0	0	237	0	88	8	5	254
Oct	Catch	0	0	0	0	91	60	0	42	0	0	193
	S.E.	0	0	0	0	25	21	0	14	0	0	35
Nov+Dec	Catch	0	0	0	0	0	0	0	0	8	1	9
	S.E.	0	0	0	0	0	0	0	0	10	1	10
Total	Catch	345	659	80	366	246	1244	105	435	633	405	4518
	S.E.	78	92	33	103	40	260	21	93	93	115	356

[a]Indirect estimate.

APPENDIX A-11. STRAIT OF GEORGIA CATCH SUMMARY FOR OTHER FINFISH, 1983.

Month		Statistical Area 13	14	15	16	17	18	19A	19B+	28	29	Total
Jan+Feb	Catch	0	79	0	2	51	111	208	7	37	10	505
	S.E.	0	20	0	4	44	41	129	0	27	8	147
Mar	Catch	0	0	0	0	0	15507	4374	3944	57	0	23882
	S.E.	0	0	0	0	0	3355	1077	1845	25	0	3977
Apr[a]	Catch	0	0	0	173	30738	4911	916	544	9	2	37293[a]
	S.E.	0	0	0	55	11102	1229	338	146	4	1	11176
May	Catch	7	1	0	442	350	1386	887	121	5	33	3232
	S.E.	4	1	0	150	63	446	360	66	3	15	600
June	Catch	277	91	5	339	797	565	786	73	0	9	2942
	S.E.	61	33	3	87	241	123	202	20	0	5	356
Jul	Catch	1336	64	437	292	521	2405	81	377	206	181	5900
	S.E.	431	16	195	64	81	427	38	50	30	28	650
Aug	Catch	1563	277	28	1313	1507	4779	453	493	530	99	11042
	S.E.	188	86	11	466	330	680	158	65	59	31	930
Sep	Catch	154	293	66	560	7	124	194	46	598	211	2253
	S.E.	34	132	33	121	4	26	45	14	112	40	227
Oct	Catch	0	397	0	49	4100	225	30	439	613	398	6251
	S.E.	0	247	0	43	1549	67	11	149	244	128	1602
Nov+Dec	Catch	0	27	0	475	88	98	4	3	96	9	800
	S.E.	0	41	0	395	94	97	4	4	103	8	432
Total	Catch	3337	1229	536	3645	38159	30111	7933	6047	2151	952	94100
	S.E.	475	299	198	653	11218	3693	1221	1859	297	142	12055

[a]Indirect estimate.

APPENDIX B. ANNUAL PROPORTION OF CHINOOK CATCH AT AGE BY PERIOD, 1983 TO 1988.

		Year						85-88
	Period	1983	1984	1985	1986	1987	1988	Mean
Age 2	March	(0.001)	(0.001)	0.000	0.005	0.000	0.000	0.001
	April	(0.003)	(0.003)	0.000	0.000	0.010	0.003	0.003
	Jan-Feb May-Dec	(0.996)	(0.996)	1.000	0.995	0.990	0.997	0.996
Age 3	March	(0.052)	(0.052)	0.056	0.022	0.086	0.044	0.052
	April	(0.049)	(0.049)	0.052	0.017	0.079	0.046	0.049
	Jan-Feb May-Dec	(0.900)	(0.900)	0.892	0.961	0.835	0.910	0.900
Age 4	March	(0.064)	(0.064)	0.041	0.022	0.109	0.082	0.064
	April	(0.057)	(0.057)	0.065	0.021	0.095	0.046	0.057
	Jan-Feb May-Dec	(0.880)	(0.880)	0.894	0.957	0.796	0.872	0.880
Age 5	March	(0.043)	(0.043)	0.000	0.063	0.109	0.000	0.043
	April	(0.029)	(0.029)	0.037	0.046	0.031	0.000	0.029
	Jan-Feb May-Dec	(0.929)	(0.929)	0.963	0.891	0.860	1.000	0.929

NOTE: Values in brackets represent the 85-88 mean proportion.

APPENDIX C. STRAIT OF GEORGIA CREEL SURVEY STUDY AREA.

The Strait of Georgia Creel Survey study area includes those waters of Juan de Fuca Strait and the Strait of Georgia bounded in the south by a line from Sheringham Pt. on Vancouver Island due south to an intersection with the International Boundary and along the International Boundary to the B.C. Mainland coast at Blaine (Boundary Bay) and in the north by the following 3 boundary lines:

1) in discovery passage from Granite Pt. on Quadra Island to the stream mouth west of Moriarity Pt. on Vancouver Island.

2) in Okisollo Channel from Granite Pt. on Quadra Island due north to Sonora Island.

3) in Cordero Channel from Burnt Bluff on the mainland 214° passing west of Dent Island to Sonora Island.

The area for which the Strait of Georgia Creel Survey statistics apply includes the above listed administrative area with the exception of the following areas:

1) Bute Inlet above a line from Lawrence Pt. running across the inlet. This area coincides with management units 13-21 and 13-22.

2) Waters of Pryce Channel, Waddington Channel, Pendrell Sound, Homfray Channel and Toba Inlet bounded by a line drawn from Horace Head on East Redonda Island at the south end of Waddington Channel to the northern point of Roscoe Bay on West Redonda Island and a line drawn within Homfray Channel from Price Pt. on the eastern shore of the channel by a line drawn from George Head at the easterly entrance of Ramsay Arm to Sutil Pt. on Cortes Island.

3) Hotham Sound above a line drawn from Elephant Point on the western shore of the Sound to the southern point of Granville Bay on the eastern shore of the Sound.

4) Jervis Inlet above a line drawn within Prince of Whales Reach from the mouth of Treat Creek on the east shore across the Reach to the summit (1625') at the head of Goliath Bay.

5) Sechelt Inlet including Narrows Inlet and Salmon Inlet above a line drawn within Skookumchuck Narrows from the "dog-leg" point southeast of the Egmont Pt. 224° across the Narrows to Sechelt Peninsula.